

**Phase 1 Heritage Impact Assessment of a proposed new
0.6 ha ostrich farming facility near Petrusburg, FS
Province.**

Report prepared for:
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by

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Summary

A phase 1 Heritage Impact Assessment was carried out for a proposed new ostrich farm facility, located on a 0.6 ha area located about 17 km north of Petrusburg. The affected area itself is underlain by geologically recent, Quaternary-age surface calcretes (*Qc*), aeolian sand and residual soils. There are no exposures of older bedrock units at the site. Several uncapped and heavily rolled stone tools and were recorded during the pedestrian survey, but no evidence was found of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of rock art, prehistoric structures or historical buildings older than 60 years within the vicinity of the study area. Provided that all planned activities are restricted to within the boundaries of the affected area as indicated in Figure 1, the probability of palaeontological impact during the operational phase of the development is considered unlikely. The nature of the proposed development will almost certainly have an adverse affect on residual topsoils (Quaternary sediments) that are largely disturbed as a result of prior farming activities. However, it is unlikely that the proposed development will result in any significant archaeological impact at the site. Potentially fossil-bearing rock units within the broader region include Adelaide Subgroup strata and Quaternary alluvial sediments, spring deposits and pan dunes (lunettes). The field assessment shows that none of these rock units and sedimentary types is represented within the study area, which is largely mantled by calcretes and aeolian sands of low palaeontological sensitivity. The proposed development does not pose a significant threat to paleontological heritage resources and there are no major palaeontological grounds to halt the project. However, in the unlikely event of fossil remains being uncovered during construction activities, it is advised that SAHRA and a qualified palaeontologist are informed immediately so that appropriate mitigation measures can be taken. The area demarcated for the proposed development is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C)

Introduction

A phase 1 Heritage Impact Assessment was carried out for a proposed new ostrich farm facility, located on a 0.6 ha area located about 17 km north of Petrusburg (**Fig. 1**).

The study is required in terms of Section 38 of the National Heritage Resources Act 25 of 1999 as a prerequisite for any development which will change the character of a site exceeding 5 000 m² in extent. The task involved identification and mapping of possible archaeological heritage within the proposed project area, an assessment of their significance, related impact by the proposed development and recommendations for mitigation where relevant.

Terms of Reference

- Identify and map possible archaeological sites and occurrences using available resources.
- Determine and assess the potential impacts of the proposed development on potential archaeological resources;
- Recommend mitigation measures to minimize potential impacts associated with the proposed development.

Methodology

The archaeological significance of the affected area was evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature. This was followed by a field assessment by means of a pedestrian survey. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes. Relevant archaeological information, aerial photographs and site records were consulted and integrated with data acquired during the on-site inspection.

Description of the Affected Area

1 : 50 000 scale topographic map: 2825 CD Cheddar

General site coordinates : 28°57'36.59"S 25°23'26.14"E

The study area is located on a 0.6 ha area located about 17 km north of Petrusburg.

The terrain is part an existing farming area that is capped by aeolian sands and calcrete-rich residual soils that are covered by grasses and shrubs. The site appears to be used mostly for grazing at present (**Fig. 3 & 4**).

Background

Geology

The site is located near the western and eastern peripheries of the Permian Adelaide Subgroup and Tierberg Formation outcrop areas, respectively (**Fig. 5**). The argillaceous rocks of the older Tierberg Formation (*Pt*), represents the uppermost unit of the Ecca Group (Karoo Supergroup) and primarily comprises well-laminated, dark shales with abundant carbonate concretions, inter-bedded by siltstones and fine-grained sandstones (Zawada 1992). The overlying Adelaide Subgroup (*Pa*, Beaufort Group, Karoo Supergroup) strata are represented by blue-grey and purple mudstone inter-bedded with yellow sandstone and siltstone. Dolerite (*Jd*, Karoo Dolerite Suite), in the form of dykes and sills, is common throughout the region and intruded into Karoo Supergroup rocks as large volumes of Drakensberg lavas during the Jurassic Period. Being more resistant to weathering than the surrounding sedimentary rocks it gave rise to the characteristically flat –topped hills in the region. Dolerites are not palaeontologically significant and can be excluded from further consideration in the present evaluation.

Archaeology

The archaeological footprint in the area are primarily represented by Stone Age surface occurrences, structural remnants dating back to the Anglo Boer War and its aftermath, graveyards and other historical structures.

Stone Age archaeological sites in the region are generally associated with river courses, spring areas or pans. Numerous Middle Stone Age and Later Stone artefacts, have been found eroding out of Pleistocene alluvial terraces and dongas along the Modder River and its tributaries north of Petrusburg. Pan lunettes occasionally provided a locus for prehistoric human habitation in the past and as a result, frequently contain stone tool assemblages, such as at Liebenbergspan (Voigts Post), approximately 5 km southwest of Petrusburg (Horowitz *et al.* 1978). In addition, spring deposits occasionally found in the vicinity of pans, such as at Florisbad

northwest of Bloemfontein and Baden Baden north of Dealesville are renowned for their intact stone tool assemblages and archaeozoological remains (Brink 1987).

Palaeontology

The palaeontological footprint in the region is primarily represented by Permian Karoo vertebrate fauna and Late Cenozoic (Quaternary) macrofossils (Broom 1909 a, b; Kitching 1977; Brink 1987; Churchill *et al* 2000; Rossouw 2006).

Fossils from the Ecca Group rocks (Tierberg Formation) are poorly represented and occur mainly as sparsely distributed and generally not diverse assemblages of trace fossils (Anderson 1976; De Beer *et al.* 2002; Viljoen 2005; Johnson *et al.* 2006). These ichno-assemblages include arthropod trackways and associated resting impressions, fish swimming trails, horizontal epichnial furrows often attributed to gastropods, as well as a variety of different kinds of small burrows. Impressions of *Gondwanidium validum* and pieces of *Dadoxylon* have been discovered between Douglas and Belmont, south of Kimberley (McLaren 1976). Sponge spicules, fish scales and disarticulated microvertebrate remains from calcareous concretions have also been recorded (Zawada 1992, Bosch 1993). The succession of the overlying Beaufort Group sedimentary rocks is subdivided into eight biostratigraphic units, called assemblage zones (Rubidge 1995) (**Fig. 6**).

Quaternary-age surface sediments in the region can be highly fossiliferous in places, especially those that are directly related to fluvial environments along major river courses, spring areas or pans (**Fig. 7**). Fossil assemblages, individual specimens and fossilized hyena burrows have been found preserved in Late Pleistocene alluvial sediments of the Modder River (Broom 1909 a, b; Cooke 1955; Churchill *et al.* 2000; Rossouw 2006). These assemblages are frequently made up of an assortment of mammalian bones and teeth. Numerous fossil sites, often associated with Middle Stone Age artefacts, have been found eroding out of Pleistocene alluvial terraces and dongas along the Modder River between Bloemfontein and Ritchie, southwest of Kimberley (**Fig. 7 no. 1 & 2**). Fossils discovered at various fossil sites along the Modder River and its tributaries revealed the existence of a number of open grassland adapted herbivores (*Equus capensis*, *Megalotragus priscus*, *Pelorovis antiquus*, *Antidorcas bondi* and *Equus lylei*).

Fossilized bone accumulations as well as fossiliferous sediments (local peat deposits) also occur within calcified pan dunes frequently found in the region, such as at

Liebenbergspan (Voigts Post, approximately 2 km southwest of the study area), Deelpan and Sunnyside Pan (Horowitz *et al.* 1978; Scott and Klein 1981; Butzer 1984) (**Fig. 7 no. 3 – 5**). When these types of pans were formed, the prevailing winds blew unconsolidated material (aeolian sands) into newly formed lunettes on the lee side of the deflation hollows which occasionally provided a locus for hyena activities (burrows) and prehistoric human habitation in the past (**Fig. 8**). In addition, spring deposits occasionally found in the vicinity of pans, such as at Florisbad northwest of Bloemfontein and Baden Baden north of Dealesville, may contain Pleistocene vertebrate fossils and plant microfossils (Brink 1987; Scott & Rossouw 2005) (**Fig. 7 - 10**)

Field Assessment

The affected area itself is underlain by geologically recent, Quaternary-age surface calcretes (*Qc*), aeolian sand and residual soils (**Fig. 9**). There are no exposures of older bedrock units at the site. Several uncapped and heavily rolled stone tools were recorded during the pedestrian survey, but no evidence was found of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape (**Fig. 10 & 11**) There are also no indications of rock art, prehistoric structures or historical buildings older than 60 years within the vicinity of the study area.

Impact Statement

The affected area is capped by superficial deposits made up of Quaternary-age aeolian sands and surface calcretes. Provided that all planned activities are restricted to within the boundaries of the affected area as indicated in Figure 1, the probability of palaeontological impact during the operational phase of the development is considered unlikely. The nature of the proposed development will almost certainly have an adverse affect on residual topsoils (Quaternary sediments) that are largely disturbed as a result of prior farming activities. However, it is unlikely that the proposed development will result in any significant archaeological impact at the site.

Recommendations

Potentially fossil-bearing rock units within the broader region include Adelaide Subgroup strata and Quaternary alluvial sediments, spring deposits and pan dunes

(lunettes). The field assessment shows that none of these rock units and sedimentary types is represented within the study area, which is largely mantled by calcretes and aeolian sands of low palaeontological sensitivity.

The proposed development does not pose a significant threat to paleontological heritage resources and there are no major palaeontological grounds to halt the project. However, in the unlikely event of fossil remains being uncovered during construction activities, it is advised that SAHRA and a qualified palaeontologist are informed immediately so that appropriate mitigation measures can be taken.

In accordance with the types and ranges of heritage resources as outlined in Part 2, Sections 34, 35 and 37 of the National Heritage Resources Act (No 25 of 1999), there is no above-ground evidence of residential building structures or material of cultural significance or intact archaeological sites within the demarcated area. The area demarcated for the proposed development is regarded as of low archaeological significance and is assigned the rating of Generally Protected C (GP.C) (**Table 1**).

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DECLARATION OF INDEPENDENCE

I, Lloyd Rossouw, declare that I act as an independent specialist consultant. I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference. I have no interest in secondary or downstream developments as a result of the authorization of this project.

A handwritten signature in black ink, appearing to read 'L Rossouw', written in a cursive style.

13 / 08 / 2019

Table 1. Field rating categories as prescribed by SAHRA.

Field Rating	Grade	Significance	Mitigation
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP.A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction



Figure 1. Aerial view and layout of the study area.



Figure 2. Aerial view of the site (yellow star) and its position in relation to Petrusburg.



Figure 3. General view of the site, looking west.



Figure 4. General view of the site, looking east.

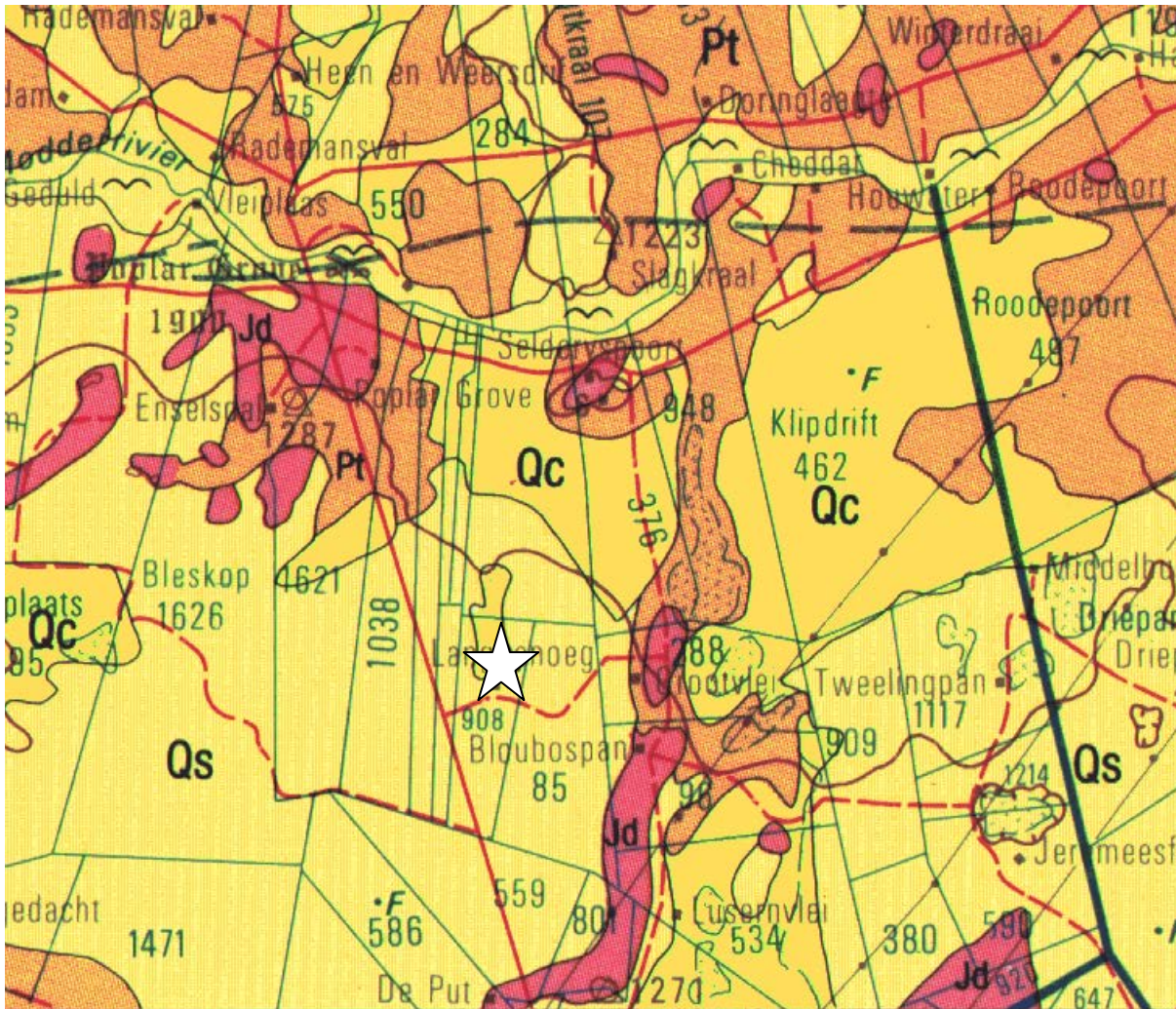


Figure 5. Portion of 1 : 250 000 scale geological map 2824 Kimberley. The study area (white star) is located within the Ecca Group (Pt) of the Karoo Supergroup.

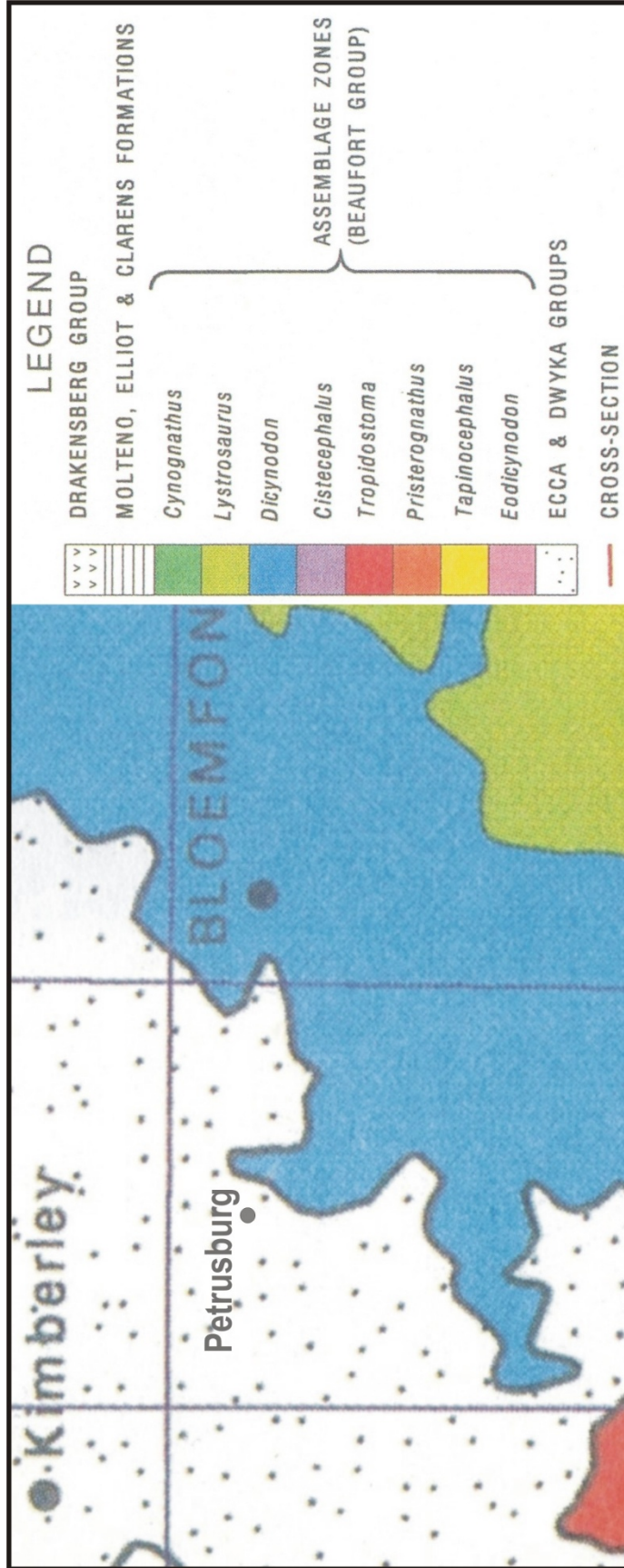


Figure 6. Geographical distribution of vertebrate biozones of the Beaufort Group near Petrusburg (after Rubidge 1995).



Figure 7. Important fossil localities in the region northwest of Bloemfontein.



Figure 8. Fossiliferous pan dunes at Deelpan between Bloemfontein and Petrusburg.



Figure 9. General view of the condition of the veld within the study area.



Figure 10. Weathered hornfels artefacts recorded as isolated occurrences on the landscape.



Figure 11. Informal, hornfels stone flakes recorded as isolated occurrences on the landscape.