

Phase 1 Heritage Impact Assessment of an existing
quarry and new crusher plant site at Vogel's Rand 373/0,
Venterburg District, FS Province.



Report prepared for
H2ON Environmental Consultants
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Executive Summary

- A Phase 1 Heritage Impact Assessment was carried out along designated areas on the farm Vogel's Rand 373/0, where anticipated development calls for the development of an existing quarry and a new crusher plant nearby.
- There is no evidence of **intact or capped** Stone Age, Iron Age archaeological or Quaternary fossil material within the confines of the footprint.
- There is no evidence of graves, graveyards or historical structures within the confines of the footprint.
- Impact on potential *in situ* fossil or archaeological material along the footprint is considered unlikely.
- There are no major archaeological or palaeontological grounds to suspend the proposed development. The site has been sufficiently recorded, mapped and documented in terms of conditions necessary for a Phase 1 heritage impact assessment and can be accessed for development.

Introduction

At the request of H2ON Environmental Consultants, a Phase 1 Heritage Impact Assessment was carried out along designated areas on the farm Vogel's Rand 373/0, where anticipated development calls for the development of an existing quarry and a new crusher plant nearby (**Fig. 1**). The survey is required as a prerequisite for new development in terms of the National Environmental Management Act and is also called for in terms of the National Heritage Resources Act 25 of 1999. The site visit and subsequent assessment took place during April 2012. The task involved identification of possible archaeological and paleontological sites or occurrences in the proposed zone, an assessment of their significance, possible impact by the proposed development and recommendations for mitigation where relevant.

Description of the Affected Area

Details of development and the area surveyed

Locality data

1:50 000 topographical map 2726 DD Riebeeckstad

The site is located six kilometers west of Hennenman, next to the R70 road on the farm Vogel's Rand 373/0 (**Fig. 2**). An existing quarry is located at the site. Several access roads and farm tracks lead to the quarry. Old spoil heaps show evidence of previous industrial activities (**Fig. 3**)

Geology

Vogel's Rand 373/0 is situated within the Beaufort Group, Adelaide Subgroup (Karoo Supergroup), and is primarily represented by late Permian, Balfour Formation sedimentary rocks, which are made up of thick sandstone and relatively thin mudstone layers. These sedimentary rocks form the base on which younger, superficial deposits of Quaternary age have been deposited. Intrusive dykes and sills of resistant Jurassic dolerites determine the relief at the quarry and crusher site

Methodology

The baseline study involved a pedestrian survey of the area. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera, were used to record relevant data. Relevant archaeological and palaeontological information were

assimilated for the report and integrated with data acquired during the on-site inspection.

Table 1. General coordinates of the proposed development at the quarry and crusher site.

VRQ1	S27 57 12.0 E26 57 57.1
VRQ2	S27 57 12.9 E26 58 3.8
VRQ3	S27 57 15.5 E26 58 2.9
VRQ4	S27 47 14.5 E26 57 56.3
VRC1	S27 57 4.1 E26 58 0.3
VRC2	S27 57 6.0 E26 58 8.9
VRC3	S27 57 9.4 E26 58 15.0
VRC4	S27 57 13.4 E26 58 9.9
VRC5	S27 57 8.8 E26 58 7.1
VRC6	S27 57 7.4 E26 57 59.7

Palaeontological Background

The Karoo geological strata underlying Vogel's Rand 373/0 are assigned to the *Dicynodon* Assemblage Zone (AZ) (**Fig. 4**). This biozone is characterized by the presence of a distinctive and fairly common dicynodont genus. Therapsids from this biozone occur generally well-preserved in mudrock horizons and are usually found as dispersed and isolated specimens associated with an abundance of calcareous nodules. Other vertebrate fossils include fish, amphibians and amniotes. Molluscs, insects, plant (*Dadoxylon*, *Glossopteris*) and trace fossils (arthropod trails, worm burrows) are also occur in the biozone. The sediments assigned to the *Dicynodon* AZ are associated with stream deposits consisting of floodplain mudstones and subordinate, lenticular channel sandstones.

Both the quarry and crusher sites are located on resistant Jurassic dolerites. The igneous dolerites are not fossiliferous and can be excluded from further consideration in the present heritage assessment.

A number of ancient tributaries of the Vaal River, including the Vet, Sand and Doring Rivers dissect the region. The alluvial sediments of these tributaries provide valuable sources of fossil material for the study of Late Cenozoic mammal evolution.

The discovery of *in situ* proboscidian fossil material, consisting of a lower molar, the proximal half of an ulna and a large part of a tusk from fluvial sediments over 40 meters, above the riverbed of the Sand River near Virginia, has highlighted the potential antiquity of the gravel terraces flanking the modern Sand River (**Fig. 5 no. 1**). The fossiliferous fluvial deposits are tentatively dated to the Pliocene based on the occurrence of specimens included in this taxon, in beds of early to middle Pliocene age from the Vaal River terraces and Langebaanweg. Exploratory surveys along current meanders of the Sand, Doring and Vet Rivers, and their tributaries, indicate that the fluviially derived overbank sediments of the modern rivers are moderately fossiliferous and contain fossil remains of a variety of Quaternary mammals (**Fig. 5 no. 2 & 3**).

Archaeological Background

The Free State landscape also supported Stone Age people who were prolific makers of stone tools until relatively recent times. It can be seen in the occurrence of open-site, capped or alluvial assemblages along river drainages (**Fig. 5 nos. 4 & 5**). This include Early Stone Age Acheulian bifaces and cores; long, high-backed blades from the early Middle Stone Age; typical Florisian retouched blades, trimmed points and Levallois core types; the characteristically large sidescrapers, sub-circular and endscrapers from the Lockshoek Industry of the terminal Pleistocene; and the Smithfield Industries of the Holocene. There are no records of rock engravings in the vicinity of the survey area. The survey area is situated at the western periphery of distribution of Late Iron Age settlements in the Free State. Ruins of Late Iron Age settlements are found on several farms in the region, such as at Strydfontein west of Ventersburg (**Fig. 5 no. 6**).

Results of Survey

Results of the survey are presented in Table 2.

Quarry

The quarry is underlain by igneous Jurassic dolerites with very little soil cover (**Fig. 6**). These rocks are not fossiliferous and can be excluded from further consideration in the present palaeontological assessment. A cement-built ruin is located east of the existing quarry and is associated with prior industrial activities at the site (**Fig. 7, A & B**). It is not considered to be archaeologically vulnerable. Two small cement

structures are located areas to the north of the quarry and outside the affected area (**Fig. 7 C**). There is no evidence of **intact or capped** Stone Age, Iron Age archaeological or Quaternary fossil material within the confines of the footprint. There are no indications of prehistoric structures or rock engravings within the footprint area. There is no evidence of graves, graveyards or historical structures within the confines of the footprint.

Crusher Site

The crusher site consists largely of open, disturbed veld, underlain by igneous Jurassic dolerites and overlying Quaternary soils (**Fig. 8**). Several structures related to recent farming activities were recorded in the affected area including a rubbish dump (**Fig. 9 A**), a stone-built dam wall with wind pump (**Fig. 9 B**), a dilapidated brick building (**Fig. 10 A**) and a circular cement dam (**Fig. 10 B**).

There is no evidence of **intact or capped** Stone Age, Iron Age archaeological or Quaternary fossil material within the confines of the footprint. No evidence was found of prehistoric structures or rock engravings within the footprint area. There is also no evidence of graves, graveyards or historical structures within the confines of the footprint.

Table 2. Features recorded around and within the affected area.

Feature	Coordinates	Impact	Heritage Value
Building/ruin	27°57'16.2''S 26°58'02.3''E	no	low
Small cement structure	27°57'10.49"S 26°58'2.40"E	no	low
Small cement structure	27°57'9.80"S 27°57'9.80"S	no	low
Rubbish Dump	27°57'8.32"S 26°58'9.43"E	yes	low
Rubbish Dump	27°57'10.22"S 26°58'5.79"E	no	low
Stone-built dam wall	27°57'9.05"S 26°58'6.13"E	yes	low
Brick building/ ruin	27°57'3.72"S 26°58'4.34"E	no	low
Cement dam	27°57'4.11"S 26°58'7.63"E	no	low
Spoil heaps	27°57'15.53"S 26°57'58.70"E	no	low

Statement of Significance and Recommendation

Impact on potential *in situ* fossil or archaeological material at both the quarry and crusher sites is considered unlikely. There are no major archaeological or palaeontological grounds to suspend the proposed development. The site has been sufficiently recorded, mapped and documented in terms of conditions necessary for a Phase 1 heritage impact assessment and can be accessed for development.

References

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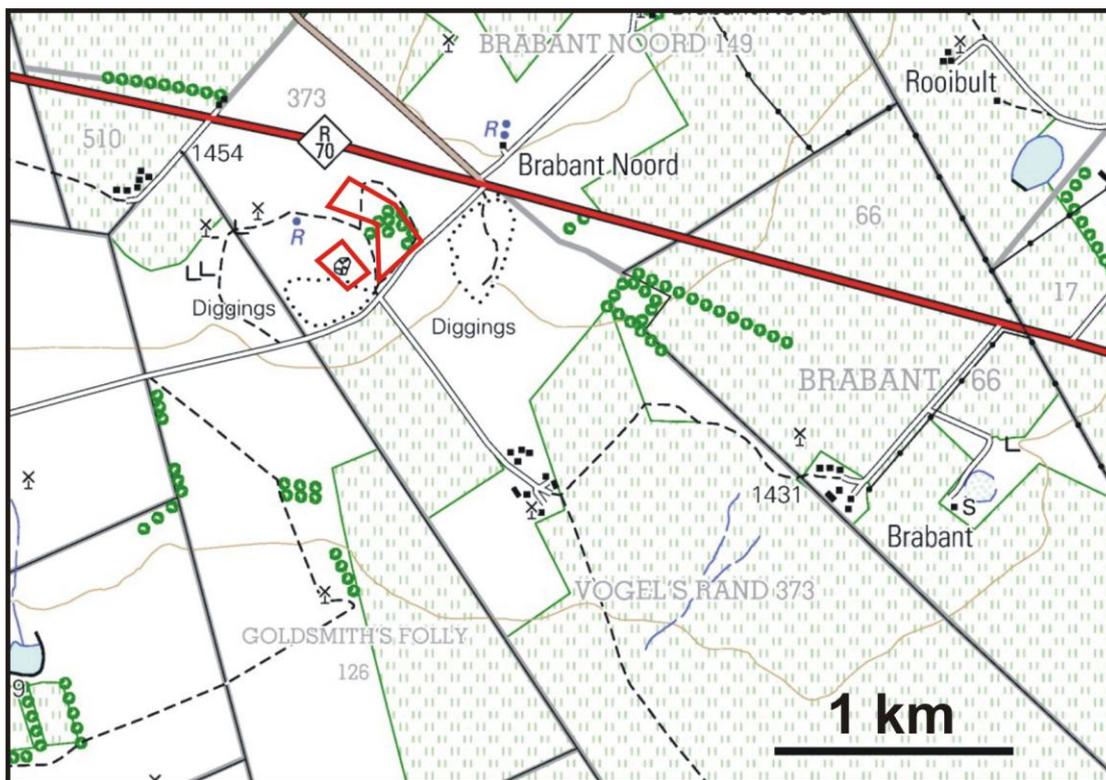


Figure 1. Portion of 1:50 000 topographic map of the site (2726 DD Riebeeckstad)..



Figure 2. Aerial view of the proposed development.



Figure 3. Spoil heaps and evidence of extensive earthmoving activities at the quarry.

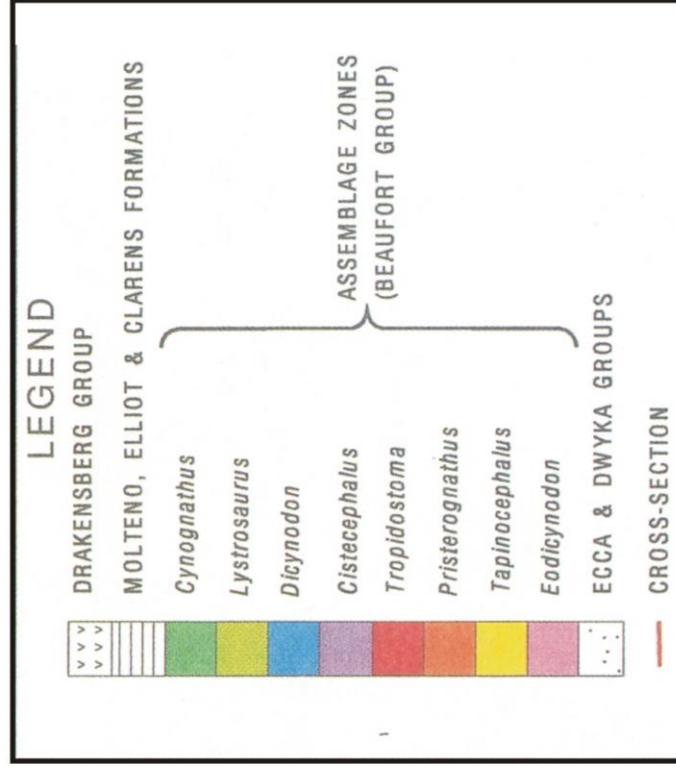
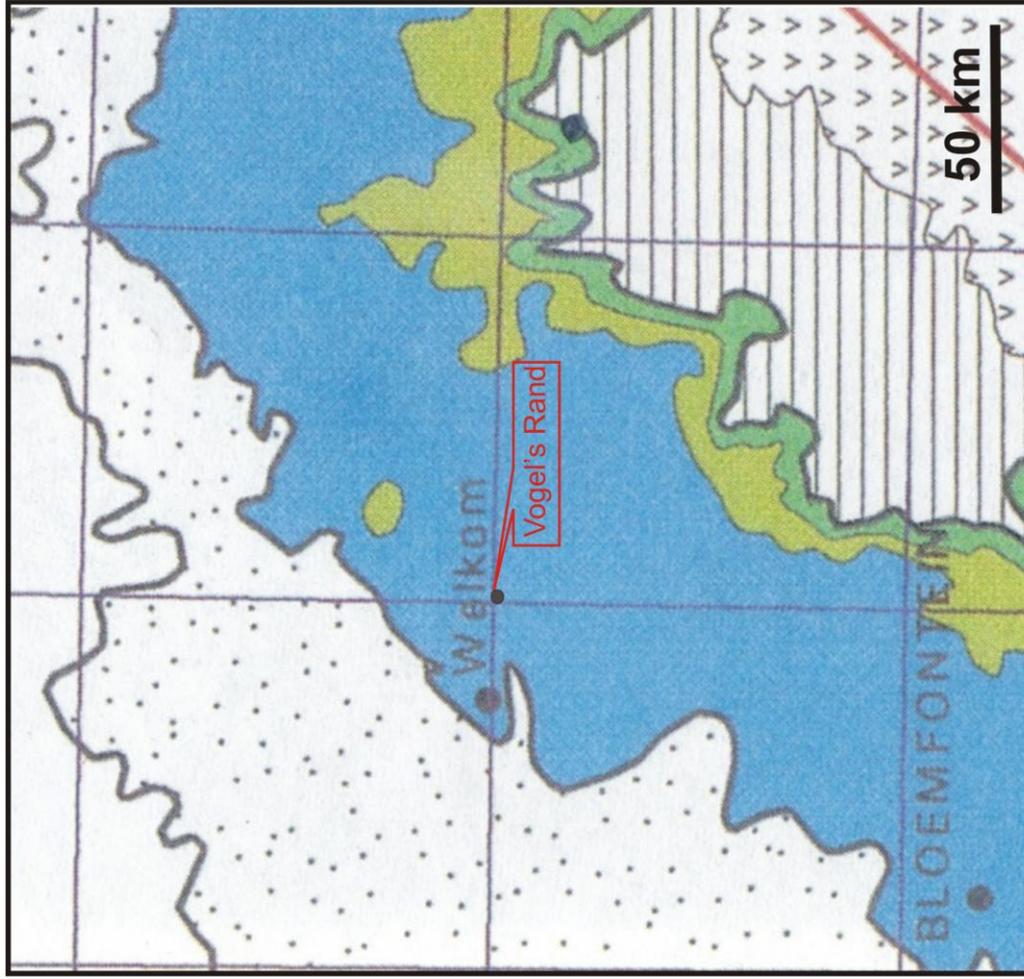


Figure 4. Geographical distribution of vertebrate biozones of the Beaufort Group around Welkom (Rubidge 1995)



Figure 5. Aerial photograph of the region showing known palaeontological and archaeological areas and localities.



Figure 6. The quarry site. It is underlain by igneous Jurassic dolerites with very little soil cover.



Figure 7. A cement-built ruin is located east of the existing quarry (A & B) while two small cement structures are located areas to the north of the quarry and outside the affected area (B).

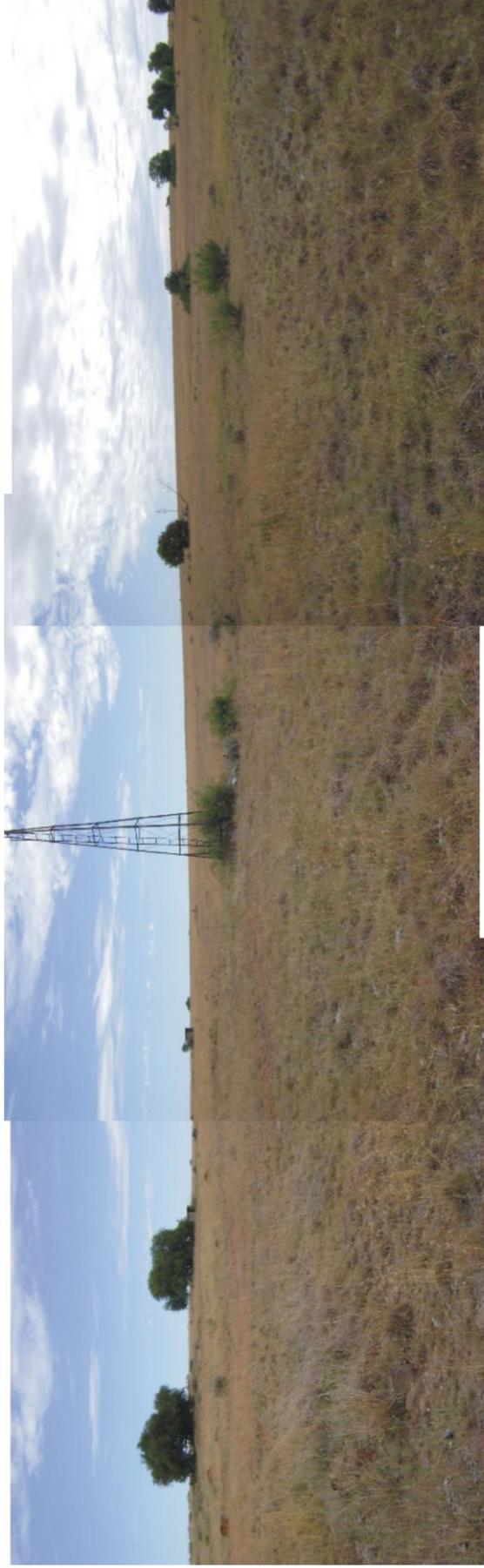


Figure 8. The crusher site consists largely of open, disturbed veld, underlain by igneous Jurassic dolerites and overlying Quaternary soils.

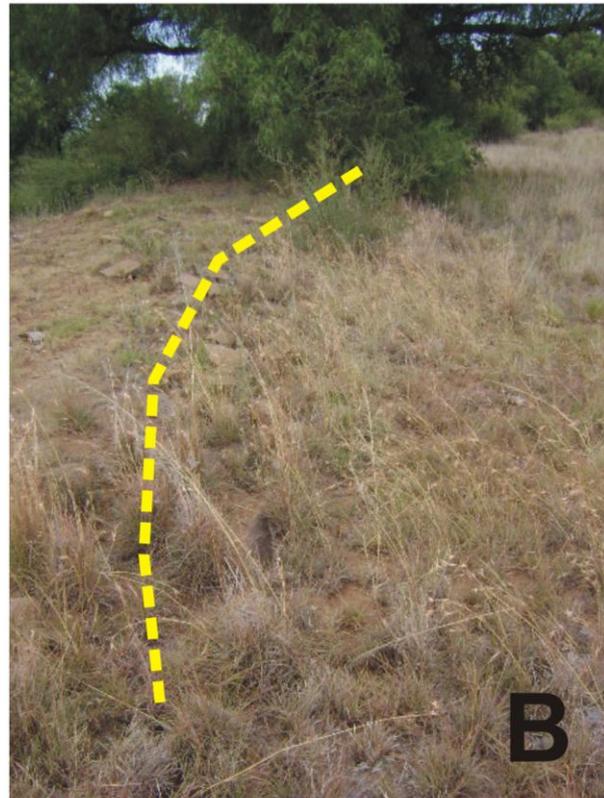


Figure 9. Features recorded at the crusher site. A rubbish dump (A) and a stone-built dam wall and wind pump (B).



Figure 10. Features recorded at the crusher site. A dilapidated brick building (A) and a circular cement dam (B).