Phase 1 Heritage Impact Assessment of the proposed new Greenfields Residential development in Postmasburg, NC Province.

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Summary

A Phase 1 Heritage Impact Assessment was carried out for the proposed new Greenfields residential development in Postmasburg in the Northern Cape Province. The development footprint is underlain by palaeontologically significant Transvaal Supergroup carbonate rocks. No fossils were recorded within superficial Quaternary sediments as expected, because geologically recent superficial overburden is generally not expected to be fossiliferous in the absence of rock shelters, pans, springs or well-developed alluvial deposits. Small, isolated and horizontally exposed dolomite exposures observed during the foot survey revealed no visible stromatolite structures. It will be difficult to determine the potentially adverse effect of excavations into potentially fossil-bearing bedrock sediments underlying the area other than to emphasize that such impacts on fossil heritage are generally irreversible. As far as palaeontological heritage is concerned, any excavation within the development footprint larger than 1 m^2 that exceeds depths of >1 m into unweathered/fresh bedrock, will need monitoring by a professional palaeontologist. It is therefore advised that, as part of a follow-up Phase 1 Palaeontological Impact Assessment, a professional palaeontologist should monitor unweathered/fresh sedimentary bedrock where large scale excavations into unweathered/fresh sedimentary bedrock are to be conducted during the construction phase of the development. The palaeontologist must apply for a valid collection / removal permit from SAHRA if fossil material is found during the construction phase of the development. Except for a number of modern man-made concrete structures, no indication of *in situ* Stone Age archaeological material were observed, either as capped assemblages or distributed as surface scatters on the landscape. There are also no indications of rock art (engravings), prehistoric mining sites, graves or historically significance buildings older than 60 years within the boundaries of the study area. The terrain in general is regarded as of low archaeological significance and is assigned a rating of Generally Protected C (GP.C). As far as the archaeological heritage is concerned, the proposed development may proceed provided that all excavation activities are restricted to within the boundaries of the development footprint.

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Introduction

A Phase 1 Heritage Impact Assessment was carried out for the proposed new Greenfields residential development in Postmasburg in the Northern Cape Province (**Fig. 1**).

The primary legal trigger for identifying when heritage specialist involvement is required in the Environmental Impact Assessment process is the National Heritage Resources (NHR) Act (Act No 25 of 1999). The NHR Act requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. Thus any assessment should make provision for the protection of all these heritage components, including archaeology, shipwrecks, battlefields, graves, and structures over 60 years of age, living heritage and the collection of oral histories, historical settlements, landscapes, geological sites, palaeontological sites and objects.

Heritage Impact Assessments are 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 (NHRA) 25 of 1999. The region's unique and non-renewable archaeological heritage sites are 'Generally' protected in terms of the National Heritage Resources Act (Act No 25 of 1999, section 35) and may not be disturbed at all without a permit from the relevant heritage resources authority. As many such heritage sites are threatened daily by development, both the environmental and heritage legislation require impact assessment reports that identify all heritage resources in the area to be developed, and that make recommendations for protection or mitigation of the impact of such sites.

The NHRA identifies what is defined as a heritage resource, the criteria for establishing its significance and lists specific activities for which a heritage specialist study may be required. In this regard, categories relevant to the proposed development are listed in Section 34 (1), Section 35 (4), Section 36 (3) and Section 38 (1) of the NHR Act and are as follows:

34. (1) No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

35 (4) No person may, without a permit issued by the responsible heritage resources

authority—

- destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
- *b)* destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

36 (3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or
- (c) bring onto or use at a burial ground or grave referred to in paragraph *(a)* or *(b)* any excavation equipment, or any equipment which assists in the detection or recovery of metals.

38 (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- The construction of a bridge or similar structure exceeding 50m in length;
- Any development or other activity which will change the character of the site

a) exceeding 5000 m² in extent; or

b) involving three or more existing erven or subdivisions thereof; or

c) involving three or more subdivisions thereof which have been consolidated within the past five years;

- The rezoning of a site exceeding 10 000 m²; or
- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA).

The significance or sensitivity of heritage resources within a particular area or region can inform the EIA process on potential impacts and whether or not the expertise of a

heritage specialist is required. A range of contexts can be identified which typically have high or potential cultural significance and which would require some form of heritage specialist involvement. This may include formally protected heritage sites or unprotected, but potentially significant sites or landscapes. In many cases, the nature and degree of heritage significance is largely unknown pending further investigation (e.g. capped sites, assemblages or subsurface fossil remains). On the other hand, it is also possible that a site may contain heritage resources (e.g. structures older than 60 years), with little or no conservation value. In most cases it will be necessary to engage the professional opinion of a heritage specialist in determining whether or not further heritage specialist input in an EIA process is required. This requires site-significance classification standards as prescribed by SAHRA (**Table 1**). Alternatively, useful sources of information on heritage resources in South Africa can also be obtained through SAHRA's national database of heritage resources, including existing heritage survey information as well as other published or secondary source material on the overall history of a particular area or site.

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 of the power line route. 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.

Terms of reference:

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

Locality data

1 : 50 000 scale topographic map: 2823AC Postmasburg

1 : 250 000 scale geological map 2822 Postmasburg

The study area is located on low topography terrain near the northeastern outskirts of Postmasburg (**Fig. 2 & 3**). According to the 1:250 000 scale geological map 2822 Postmasburg, the proposed development footprint is underlain by palaeontologically significant carbonate rocks of the ~ 2.5 Ga old Cambellrand Subgroup (*Vgl*, Ghaap Group, Transvaal Supergroup) (Beukes 1980, 1983; Erikson *et al*. 2006) (**Fig. 4 & 5**). Superficial deposits within the proposed impact area include a pebbly rubble matrix, reddish-brown sandy soils and alluvium.

Site coordinates:

A) 28°18'44.77"S 23° 4'24.87"E

B) 28°18'8.09"S 23° 5'35.00"E

C) 28°18'12.98"S 23° 5'42.39"E

D) 28°19'9.42"S 23° 5'21.06"E

E) 28°18'58.09"S 23° 4'48.10"E

F) 28°19'0.23"S 23° 4'30.08"E

G) 28°18'46.89"S 23° 4'31.71"E

Background

Palaeontology

The carbonate rocks of the Cambellrand Subgroup consist of stromatolite- and microfossil-bearing dolomite, dolomitic limestone and chert members that were formed by the precipitation of carbonate rocks when colonies of stromatolites thrived in shallow, tropical marine environments towards the end of the Archaean Eon, 2.6 billion years ago (Truswell & Eriksson 1973; Altermann & Schopf 1995). The shallow marine and lacustrine stromatolites and organic-walled microfossils preserved within the dolomites provide a record of early microbial dominated life in shallow seas and lakes during the Early / Mid Precambrian (c. 2.7-2.5 Ga). Stromatolites are layered mounds, columns, and sheet-like sedimentary rocks. They were originally formed by the growth of layer upon layer of cyanobacteria, a single-celled photosynthesizing microbe that lives today in a wide range of environments ranging from the shallow shelf to lakes, rivers, and even soils. Bacteria, including the photosynthetic cyanobacteria, were the only form of life on Earth for the first 2 billion years that life existed on Earth.

Archaeology

Multiple sites with abundant Early and Middle Stone Age (ESA & MSA) artefacts are known from the town of Kathu, located 70 km north of Postmasburg while Wonderwerk Cave, situated halfway between Kuruman and Danielskuil, is also known as an important archaeological repository (**Fig. 6**). Various archaeological investigations at the site demonstrated that Wonderwerk Cave contains *in situ*, ESA, Fauresmith, Middle Stone Age (MSA) and Later Stone Age (LSA) deposits. It is unique since few sites have yielded such a long sequence of *in situ* ESA horizons which also cover the ESA/MSA transition, while none of the other ESA sites in Southern Africa have yielded such abundant and well preserved *in situ* micro and macro-faunal and botanical remains. Several MSA and LSA sites were documented around Witsand. The LSA sites have yielded Wilton assemblages with formal lithics dominated by backed pieces including segments and scrapers. At Dikbosch between Kimberley and Griekwastad, a rock shelter located in travertine deposits of the Ghaap Plateau, has yielded LSA artefacts associated with faunal remains.

Several prehistoric specularite and haematite mines are found around Postmasburg, including underground workings on the farms Paling M87, open mining pits at Gloucester 13 and Mount Huxley, as well as open mining pits next to the town reservoir. An ancient specularite mine at Doornfontein (Doornfontein 1) north of Postmasburg has a maximum length of over 100 m and consists of four interlinked chambers (Beaumont & Boshier 1974. Excavations yielded mining tools including stone artefacts, various types of pottery, bone arrow heads, and hundreds of ostrich eggshell beads (**Fig. 7**). The most famous mining site is Blinkklipkop (Gatkoppies), situated about 2.5 km east-northeast of the eastern boundary of the study area (**Fig. 8**). The first description of this site was given P.B. Borchards, a member of the 1801 Truter and Somerville expedition to the Bechuana. Lichtenstein, in his *Travels in Southern Africa*, recounts a visit to the site in 1805, and William Burchell visited Blinkklipkop on June 18 1812 as noted in his *Travels in the Interior of Southern Africa*. The Blinkklipkop and Doornfontein sites near provide evidence of LSA mining practices and the introduction in the region of domesticated ovicaprids and possibly cattle as well as pottery by 1200 BP. Rock art sites in the region, including rock engraving as well as paintings, are known from Wonderwerk Cave (paintings) and the Danielskuil Townlands (engravings). Non-representational rock art sites near

Postmasburg include engravings from the farms Beeshoek and Klapin and paintings from Andriesfontein and Toto.

Archaeological and historical evidence suggest that the most southerly distribution of Late Iron Age Tswana settlements in the region during the 18th century AD ranged between the Langeberge and what is known today as Witsand (**Fig. 9**). The farm Nokanna, situated about 35 km north of Witsand, equates with the former BaTlaping capital of Nokaneng, where Chief Mothibi was born in about 1775.

Field Assessment

Palaeontology

No fossils were recorded within superficial Quaternary sediments as expected, because geologically recent superficial overburden is generally not expected to be fossiliferous in the absence of rock shelters, pans, springs or well-developed alluvial deposits. Small, isolated and horizontally exposed dolomite exposures observed during the foot survey revealed no visible stromatolite structures, although it is expected that excavations into fresh dolomites at the site will most likely affect intact stromatolitic structures and associated micro-fossil bearing strata (**Fig. 10**).

Archaeology

Except for a number of modern man-made concrete structures, no indication of *in situ* Stone Age archaeological material were observed, either as capped assemblages or distributed as surface scatters on the landscape (**Fig. 11**). There are also no indications of rock art (engravings), prehistoric mining sites, graves or historically significance buildings older than 60 years within the boundaries of the study area.

Impact Statement and Recommendations

Palaeontology

It will be difficult to determine the potentially adverse effect of excavations into potentially fossil-bearing bedrock sediments underlying the area other than to emphasize that such impacts on fossil heritage are generally irreversible. Conversely, the recovery of new fossils as a result of industrial excavation activities can also be considered a positive impact, but only if the process is accompanied by appropriate scientific recording and retrieval methods. As far as palaeontological heritage is

concerned, any excavation within the development footprint larger than 1 m^2 that exceeds depths of >1 m into unweathered/fresh bedrock, will need monitoring by a professional palaeontologist. It is therefore advised that, as part of a follow-up Phase 1 Palaeontological Impact Assessment, a professional palaeontologist should monitor unweathered/fresh sedimentary bedrock where large scale excavations into unweathered/fresh sedimentary bedrock are to be conducted during the construction phase of the development. The palaeontologist must apply for a valid collection / removal permit from SAHRA if fossil material is found during the construction phase of the development.

Archaeology

The terrain in general is regarded as of low archaeological significance and is assigned a rating of Generally Protected C (GP.C). As far as the archaeological heritage is concerned, the proposed development may proceed provided that all excavation activities are restricted to within the boundaries of the development footprint.

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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 and have no conflicting interests in the undertaking of the activity.

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Tables and Figures

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

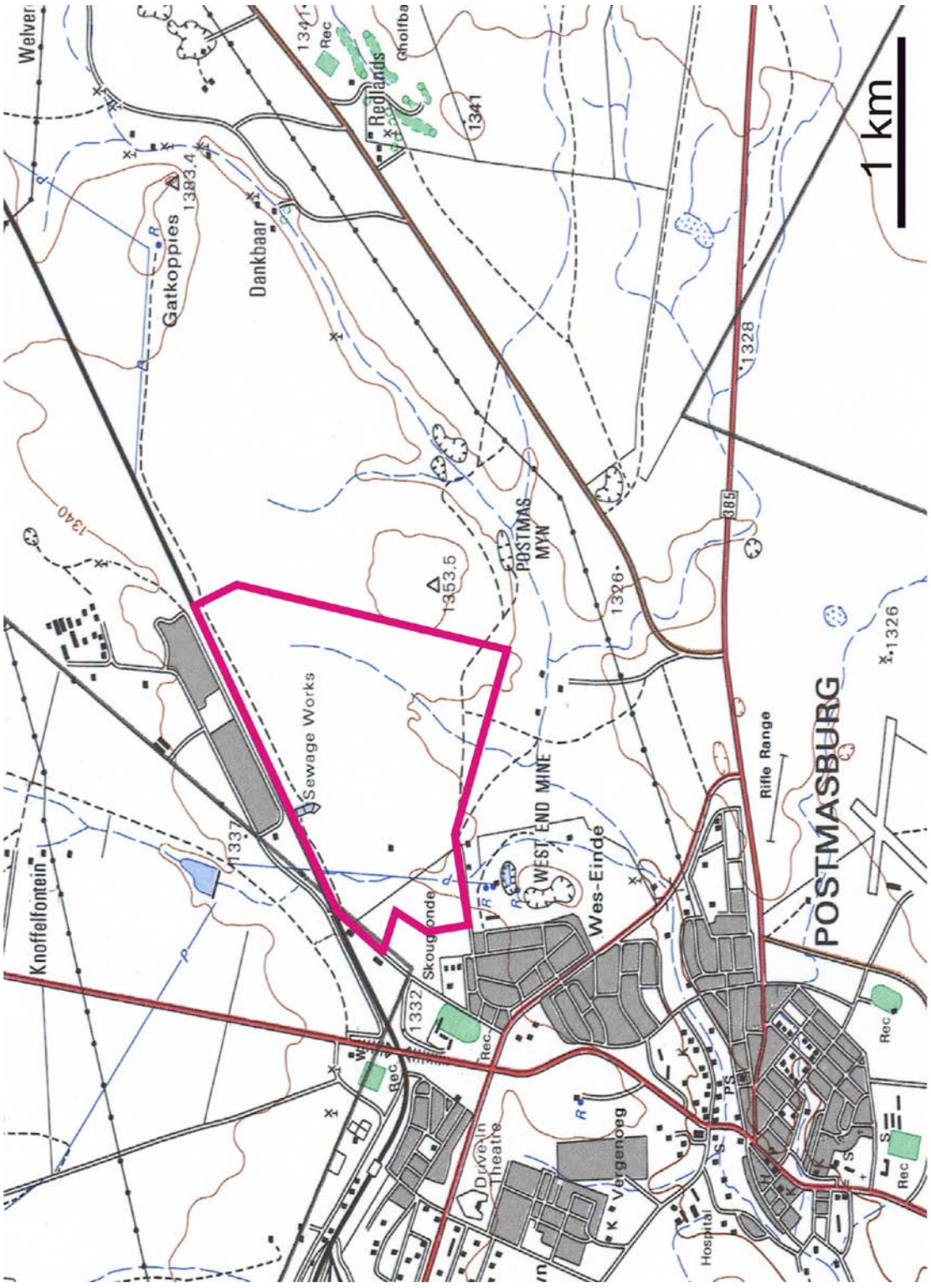


Figure 1. Map of the proposed development footprint (portion of 1:50 000 scale topographic 2823AC Postmasburg).

Figure 2. Aerial view of the study area.

Figure 3. General view of the terrain, looking west-southwest.

Figure 4. According to the 1:250 000 scale geological map 2822 Postmasburg, the proposed development footprint is underlain by palaeontologically significant carbonate rocks of the~2.5 Ga old Cambellrand Subgroup (Vgl, Ghaap Group, Transvaal Supergroup).

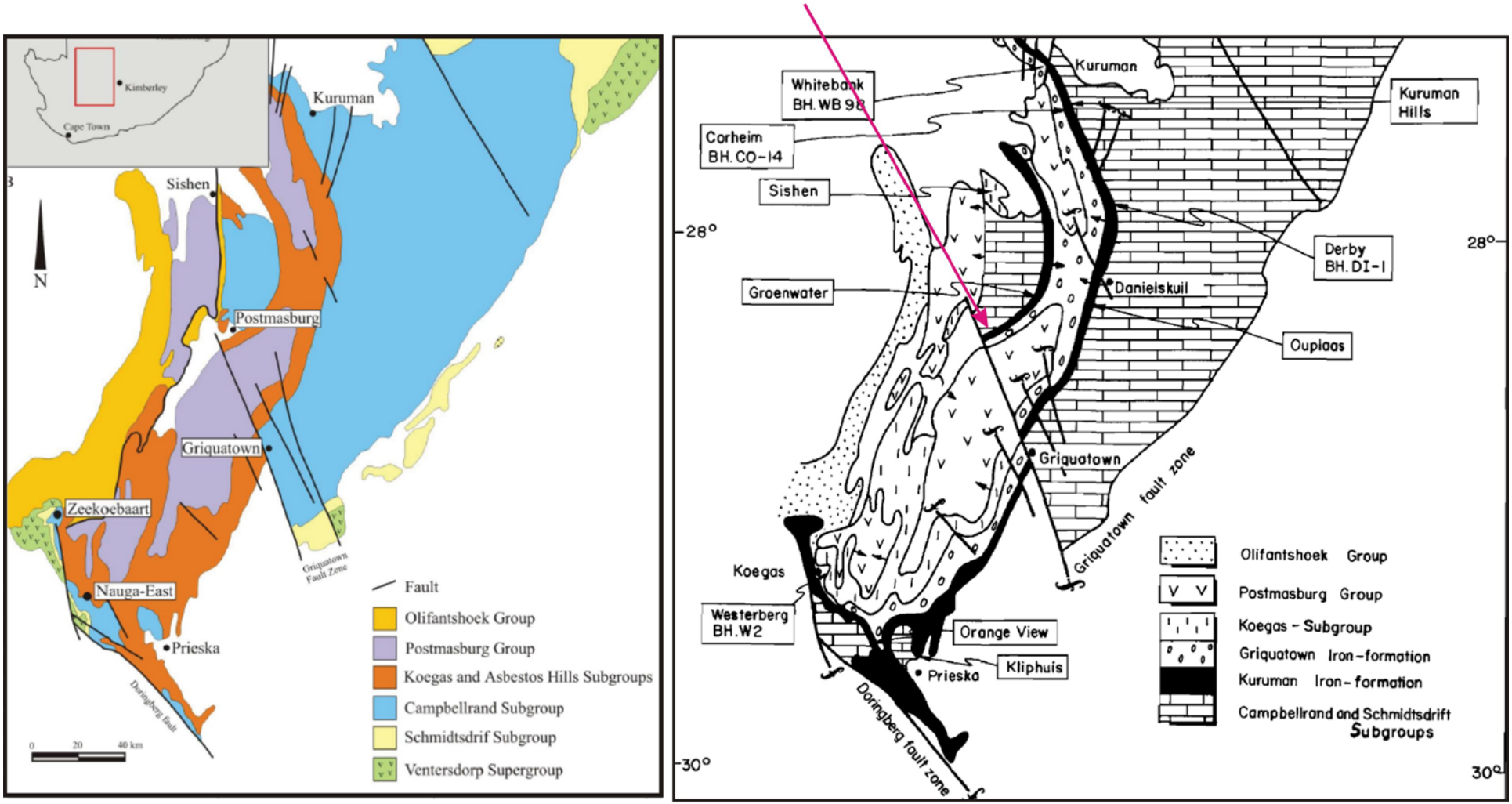


Figure 5. Regional geology according to Harding 2004 (left) and Beukes 1980 (right).

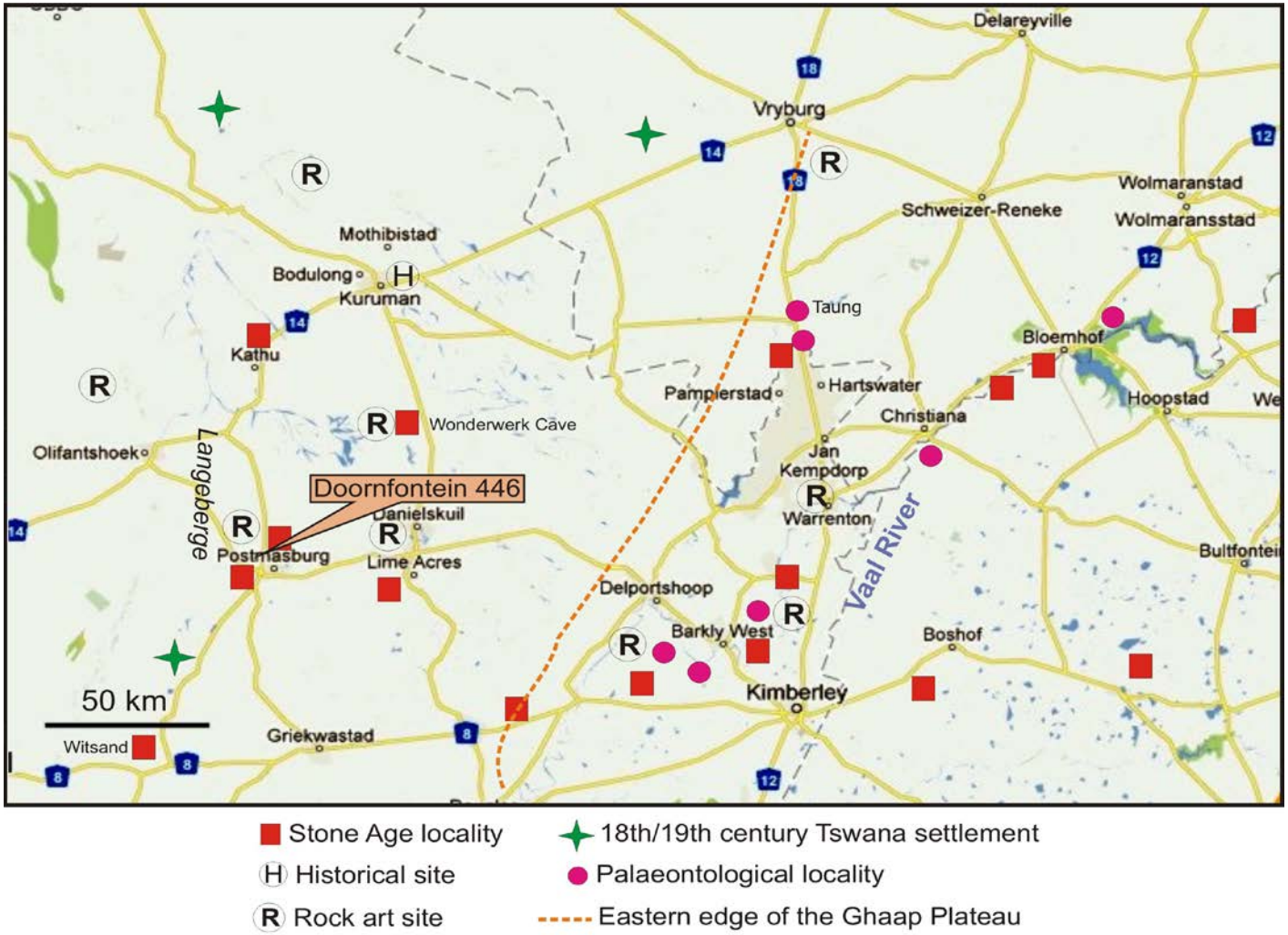
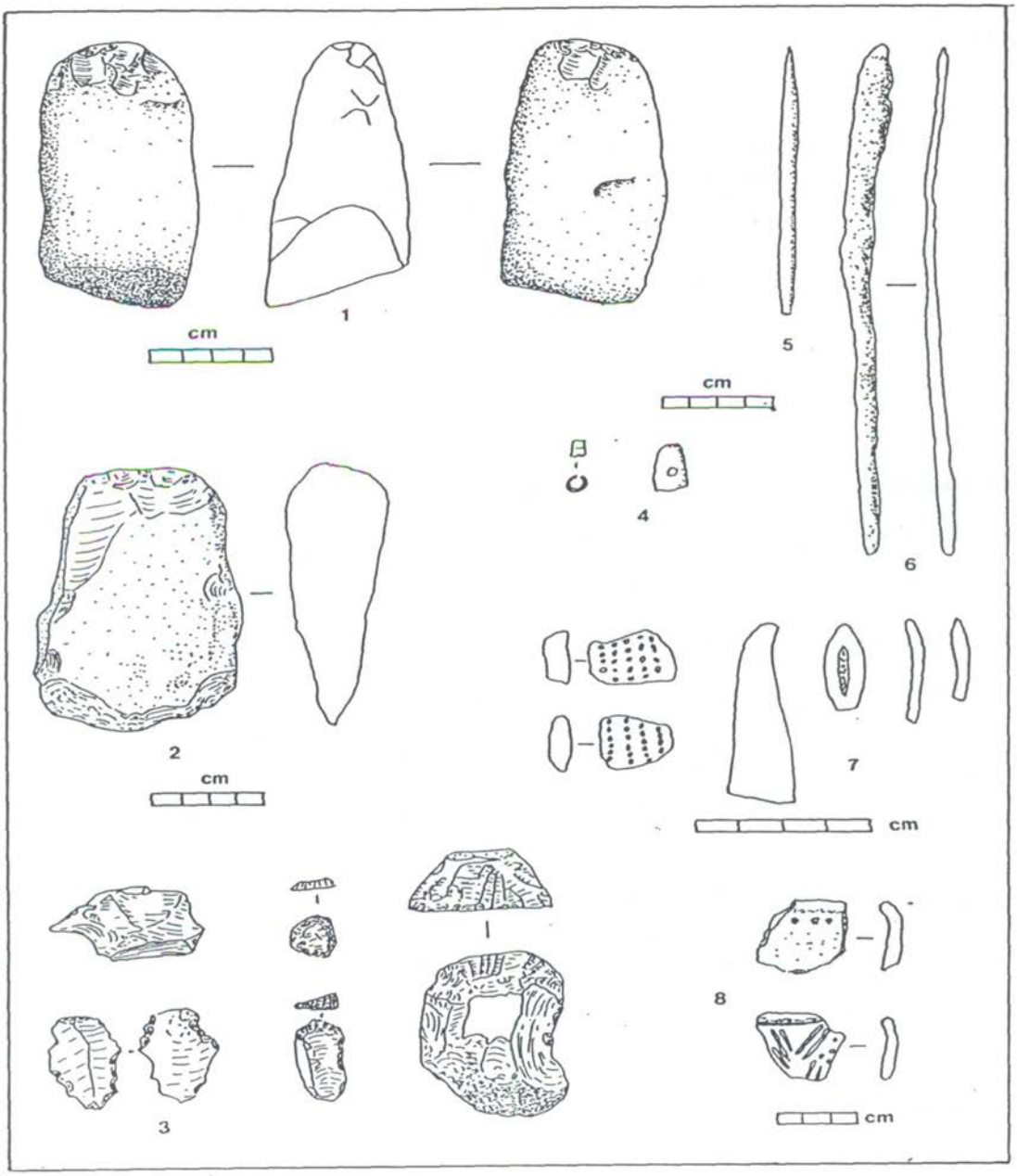


Figure 6. Major palaeontological and archaeological localities in the region



Artefacts from Blinkklipkop and Doornfontein (after Beaumont & Boshier 1974; Thackeray et al 1983). 1. Mining tool, Blinkklipkop; 2. Mining tool, Doornfontein 1/1; 3. Flake and scrapers from Doornfontein excavations and surface collection, and core scraper from Blinkklipkop surface collection; 4. Copper strip bead and possible broken bone pendant, Doornfontein 1/2; 5. Bone arrow-point, Doornfontein 1/2; 6. Iron spearhead, Doornfontein 2/1; 7. Pottery, including decorated sherds, Blikklipkop; 8. Pottery with line decorations, Doornfontein 1/2 & 1/1.

Figure 7. Artefacts recorded from Blinkklipkop and Doornfontein. Extract from Morris (1990).

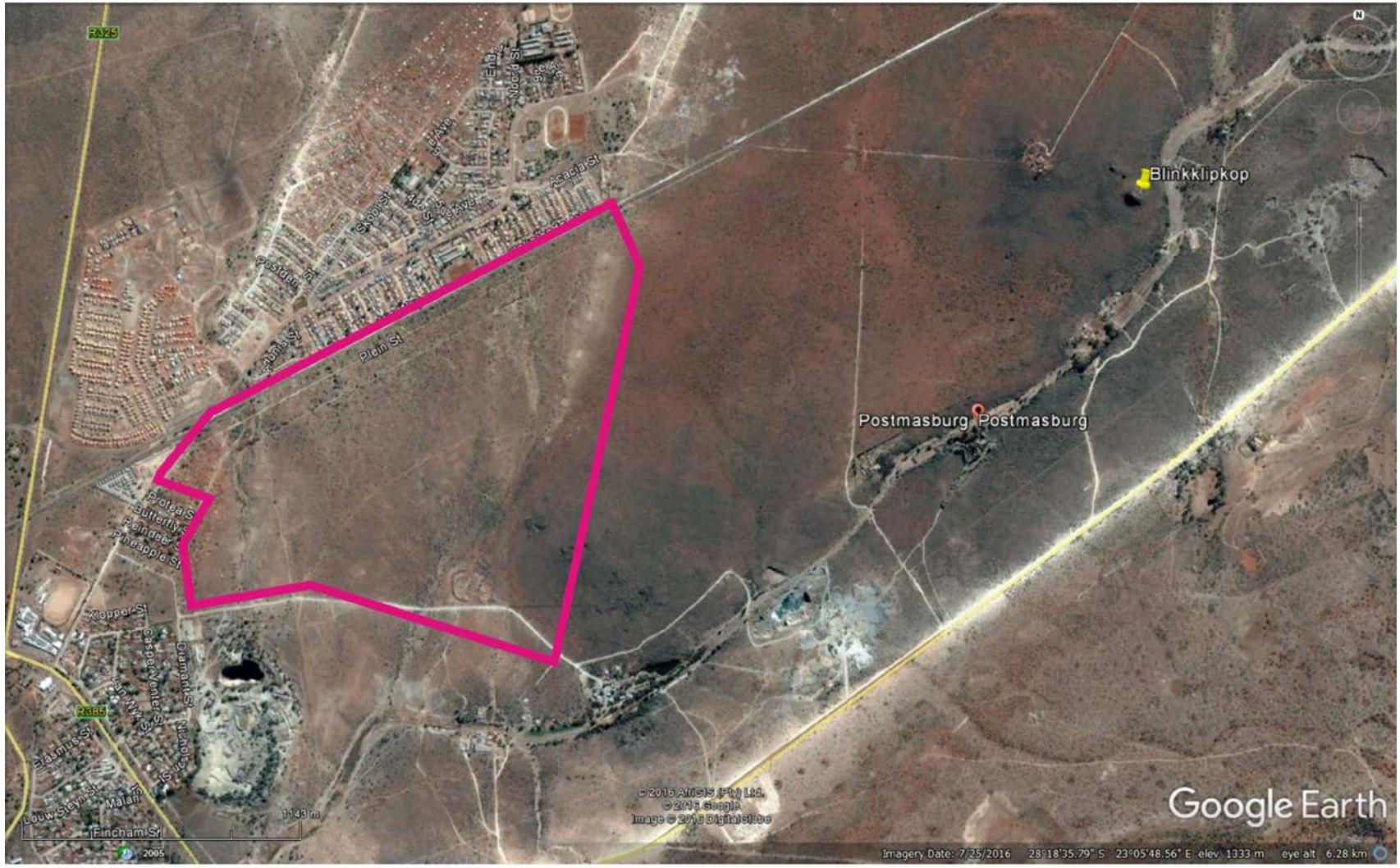


Figure 8. Position of Blinkklipkop in relation to the location of the study area.

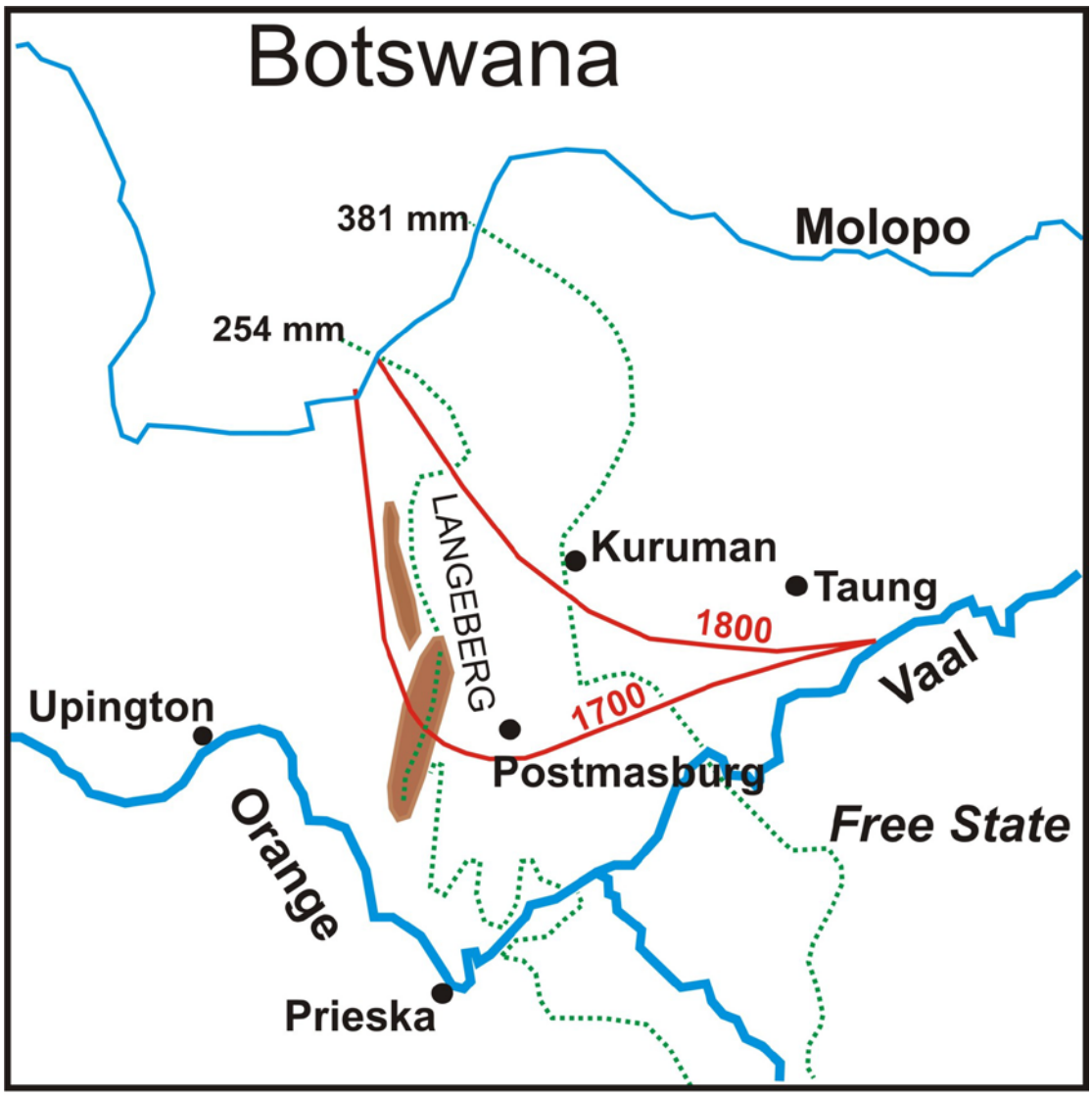


Figure 9 . Southern limits of Tswana settlement during the 18th and 19th centuries (after Humphreys 1976).

Figure 10. Horizontally exposed dolomites (left & top right) and pebbly rubble overburden (bottom right)

Figure 11. Modern, man-made concrete structures.