

Phase 1 Palaeontological and Archaeological Impact
Assessment of the proposed township extension on Farm
Ayr 75 at Frankfort, Free State Province.



Report prepared for:
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by

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Executive Summary

- At the request of NSVT Environmental Consultants in Bloemfontein, a Phase 1 Palaeontological and Archaeological Impact Assessment was carried out at a 52 ha site demarcated for the development of 729 erven including general residential, business, educational and public open spaces at the Namahadi Township in Frankfort in the Free State Province
- The affected area is made up of 52 ha of open grassland covering the top as well as the northern and eastern slopes of a resistant dolerite hill, which is located at the northern boundary of the Namahadi Township and east of the R26 road that goes to Villiers
- There is no evidence of intact or capped Stone Age archaeological material or Quaternary fossil remains within the confines of the affected areas. There are no indications of Iron Age structures or rock engravings within the affected areas. There is also no evidence of historical structures or graves within the confines of the affected area.
- There are **no major archaeological or palaeontological grounds** to suspend the proposed development.
- Recommended Grading: General Protection C (Field Rating IV C)

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Introduction

At the request of NSVT Environmental Consultants in Bloemfontein, a Phase 1 Palaeontological and Archaeological Impact Assessment was carried out at a 52 ha site demarcated for the development of 729 erven including general residential, business, educational and public open spaces at the Namahadi Township in Frankfort in the Free State Province (**Fig. 1-2**) The extent of the proposed development (over 5000 m²) falls within the requirements for a Heritage Impact Assessment (HIA) as required by Section 38 (Heritage Resources Management) of the South African National Heritage Resources Act (Act No. 25 of 1999). The site visit and subsequent assessment took place in November 2013. 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.

Methodology

The palaeontological and archaeological significance of the affected area was evaluated through a desktop study and carried out on the basis of existing field data, database information, published literature and maps. 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.

Description of the Affected Area

Details of development and the area surveyed

Details of area surveyed

Maps: 1:50 000 topographical map

1:250 000 geological map 2728 Frankfort

General Site Coordinates (**Fig. 3**):

- A) 27°15'1.83"S 28°31'13.39"E
- B) 27°14'38.25"S 28°31'27.31"E
- C) 27°14'27.64"S 28°31'6.62"E
- D) 27°14'48.49"S 28°30'50.68"E

The affected area is made up of 52 ha of open grassland covering the top as well as the northern and eastern slopes of a resistant dolerite hill, which is located at the northern boundary of the Namahadi Township and east of the R26 road that goes to Villiers (**Fig. 3 - 4**).

Geology

The geology of the region has been described by Muntingh (1989) and is lithostratigraphically subdivided into the Volksrust Formation (Ecca Group), lower Normandien Formation and upper Tarkastad Subgroup (Beaufort Group). From oldest to youngest, the geology around Frankfort is made up of Ecca Group shales, Late Permian sandstones (Normandien Formation *Pn*: type profile from nearby Normandien Pass between Memel and Harrismith), Jurassic dolerite intrusions (*Jd*, Karoo Dolerite Suite), and superficial sediments of Quaternary age, made up of residual soils and alluvium (**Fig. 5**). The Normandien Formation is distinguished by three sandstone members (Frankfort *Pf*, Rooinek *Pr*, Schoondraai *Ps*) and one mudstone member (Harrismith *Trh*) and is interpreted to have been deposited by meandering streams flanked by wide, semi-arid floodplains (Groenwald 1990). The study area is completely underlain by Jurassic dolerite intrusions (*Jd*, Karoo Dolerite Suite) (**Fig. 6**).

Background

Karoo Fossils

Biostratigraphically, rocks belonging to the Normandien Formation are assigned to the Dicynodon Assemblage Zone (AZ). The AZ is characterized by the presence of both *Dicynodon* and *Therionathus* (Kitching 1995). According to Groenwald (1990), three fossil species, namely *Dicynodon lacerticeps*, *Therionathus platyceps* and *Prorubidgea maccabei*, are present in the Schoondraai Member of the Normandien Formation, while *Lystrosaurus murrayi* sans *Dicynodon lacerticeps* is present in the overlying Harrismith Member.

Karoo Dolerites

Dolerite (*Jd*), in the form of dykes and sills are not palaeontologically significant and can be excluded from further consideration in the present palaeontological evaluation.

Archaeology

The archaeological landscape of the region is characterized by large numbers of Iron Age settlements that were built largely of stone. The type site of Iron Age settlements in the region is named after Ntsuanatsatsi hill, the legendary place of origin of the Fokeng people, which is situated between Frankfort and Vrede (Type site OU1, farm Helena, Maggs 1976). Type N settlements are the oldest Iron Age settlements from the north-eastern corner of the Free State with radiocarbon dates going back to between the 15th and 17th century A.D. (**Fig. 7**). Type N settlement units are characterized by primary enclosures arranged in a ring linked by secondary walling thus forming a large secondary enclosure in the middle (**Fig. 8**). Type N settlements subsequently led to Type V settlement units (Type site OO1 Makgwareng, Lindley District), after the former were replaced or converted into a new settlement pattern (Maggs 1976). Type V settlements spread out further to the south and east, but did not extend further than the Vet River and the Drakensberg escarpment.

Rock art (paintings) have been recorded on the farm Tweelingskop 221 near Frankfort.

Field Assessment

There is no evidence of intact or capped Stone Age artefacts, Iron Age structures or Quaternary fossils within the confines of the footprint. There are no indications of prehistoric structures or rock engravings within the footprint area. There is also no evidence of informal graves or historical structures older than 60 years within the confines of the footprint. Modern structures recorded during the survey include a water reservoir, informal dwellings and kraals (**Fig. 9**).

Impact Statement

Potential impacts are summarized in **Table 1**. Impact on potentially intact Stone Age archaeological remains, Iron Age structures or Quaternary fossils is considered unlikely. It is also unlikely that the proposed development will impact on potentially fossil-bearing bedrock because of dolerite bedrock underlying the study area.

In accordance with the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) there is no above-ground evidence of building structures older than 60 years, Stone Age archaeological remains, Iron Age structures, Quaternary fossils, or material of cultural significance

within the demarcated area. The terrain is not considered palaeontologically or archaeologically vulnerable, and there are no major palaeontological or archaeological grounds to suspend the proposed development.

Recommendation

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 palaeontological and archaeological impact assessment and can be accessed for development.

Recommended Grading: General Protection C (Field Rating IV C).

References

- Groenewald, G.H. 1990. Gebruik van palaeontologie in litostratigrafiese korrelasie in die Beaufort Groep, Karoo opeenvolging van Suid Afrika. *Palaeontologia africana* 27: 21 – 30.
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- Muntingh, D.J 1989. Die geologie van die gebied Frankfort. *Geologiese Opname*, Pretoria.
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Tables & Figures

Table 1. Summary of potential impacts at the site.

Rock type / Age	Duration of Development	Palaeontological significance	Archaeological significance	Palaeontological Impact at site	Archaeological Impact at site
Residual soils (Quaternary)	Permanent	Medium -Low	Medium - High	None	None
Dolerite Suite, <i>Jd</i> (Jurassic)	Permanent	Low	Low	None	None

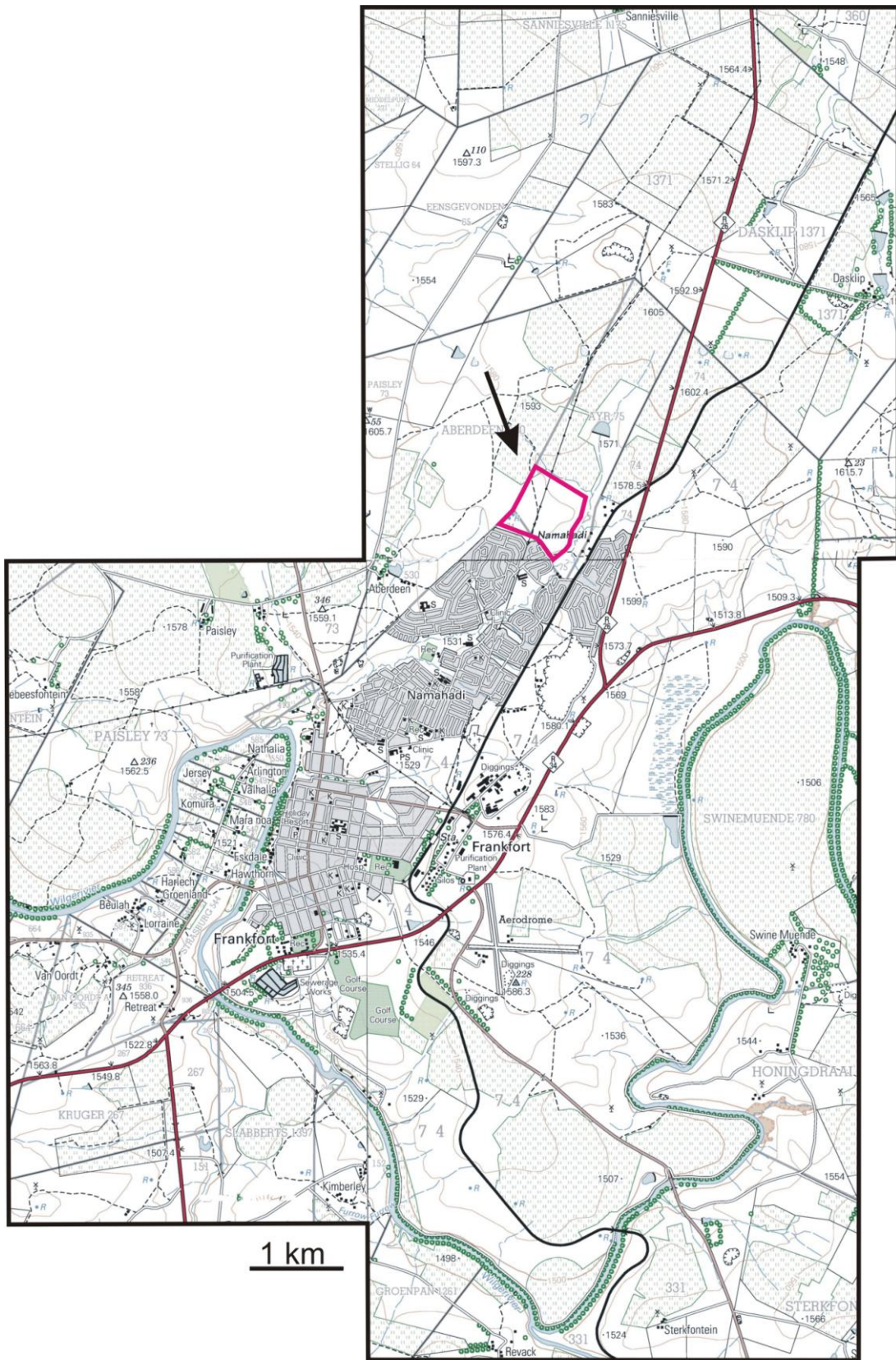


Figure 1. Map of Frankfort and study area (1:50 000 scale topographic map 2728 AD Frankfort).

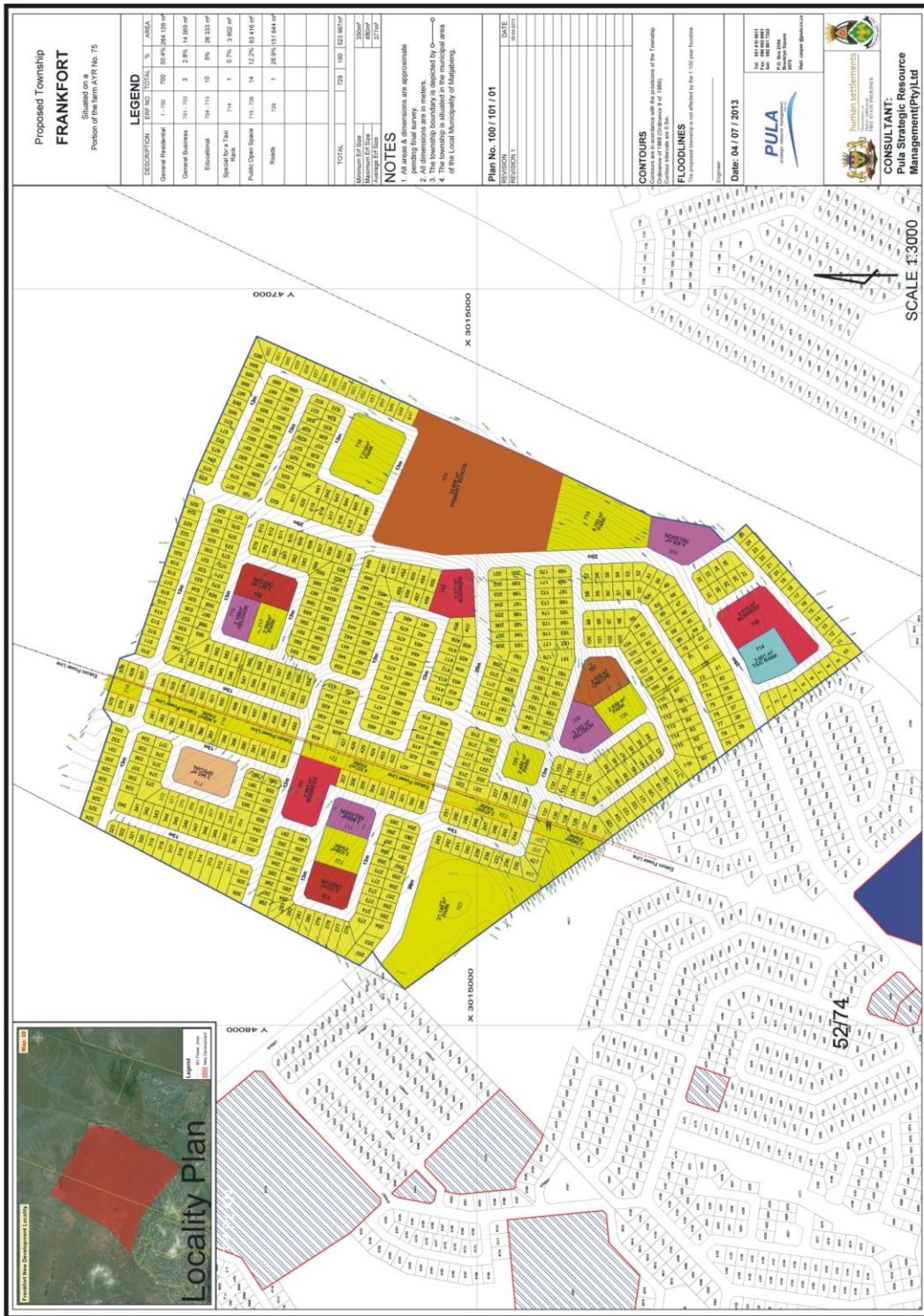


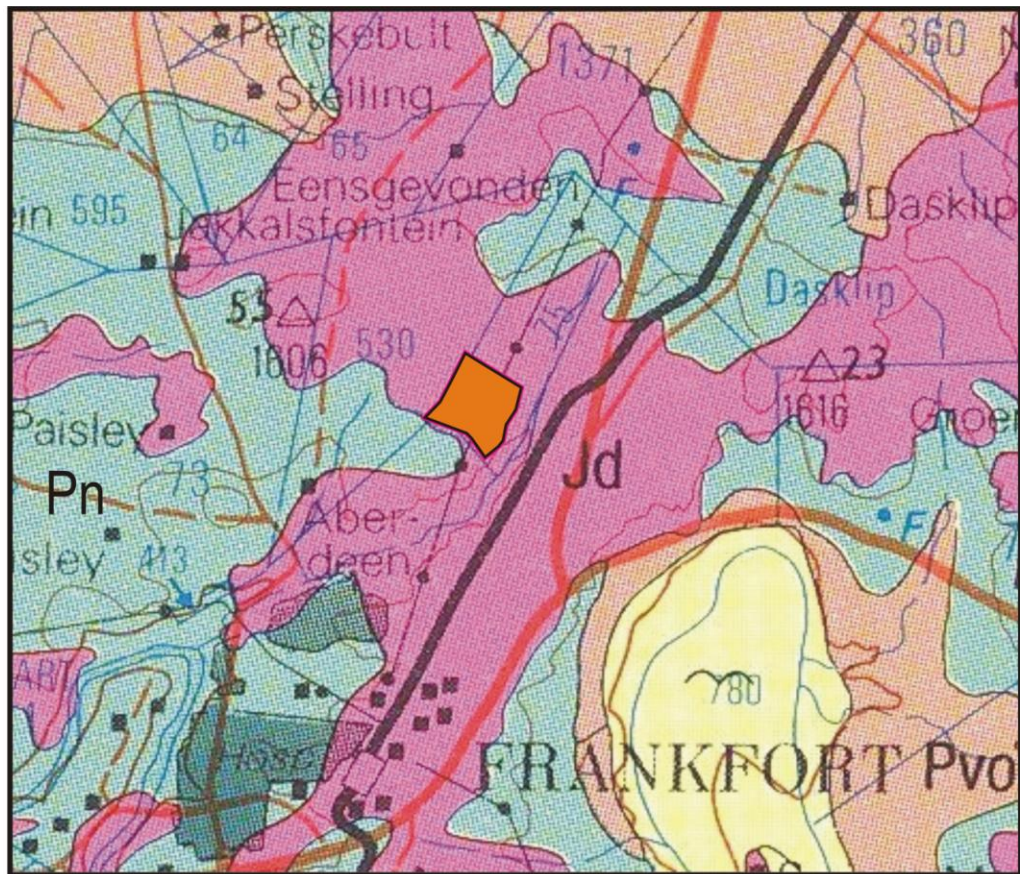
Figure 2. Layout of proposed development.




Figure 3. Aerial view of the study area.



Figure 4. The study area looking towards the dolerite hill (A), looking north (B), east (C) and west (C).



 Study Area

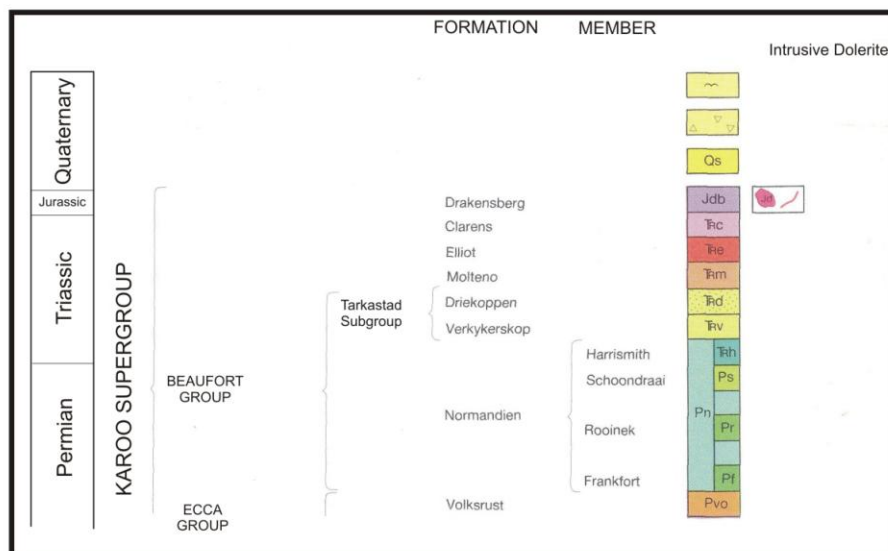


Figure 5. Portion of 1:250 000 scale geological map 2728 Frankfort. From oldest to youngest, the geology around the affected area is made up of Eccca Group shales, Permo-Triassic sandstones (Normandien Formation, *Pn*, Beaufort Group), Jurassic dolerite intrusions (*Jd*, Karoo Dolerite Suite) and superficial sediments of Quaternary age, made up of residual soils and alluvium (flying bird symbol).

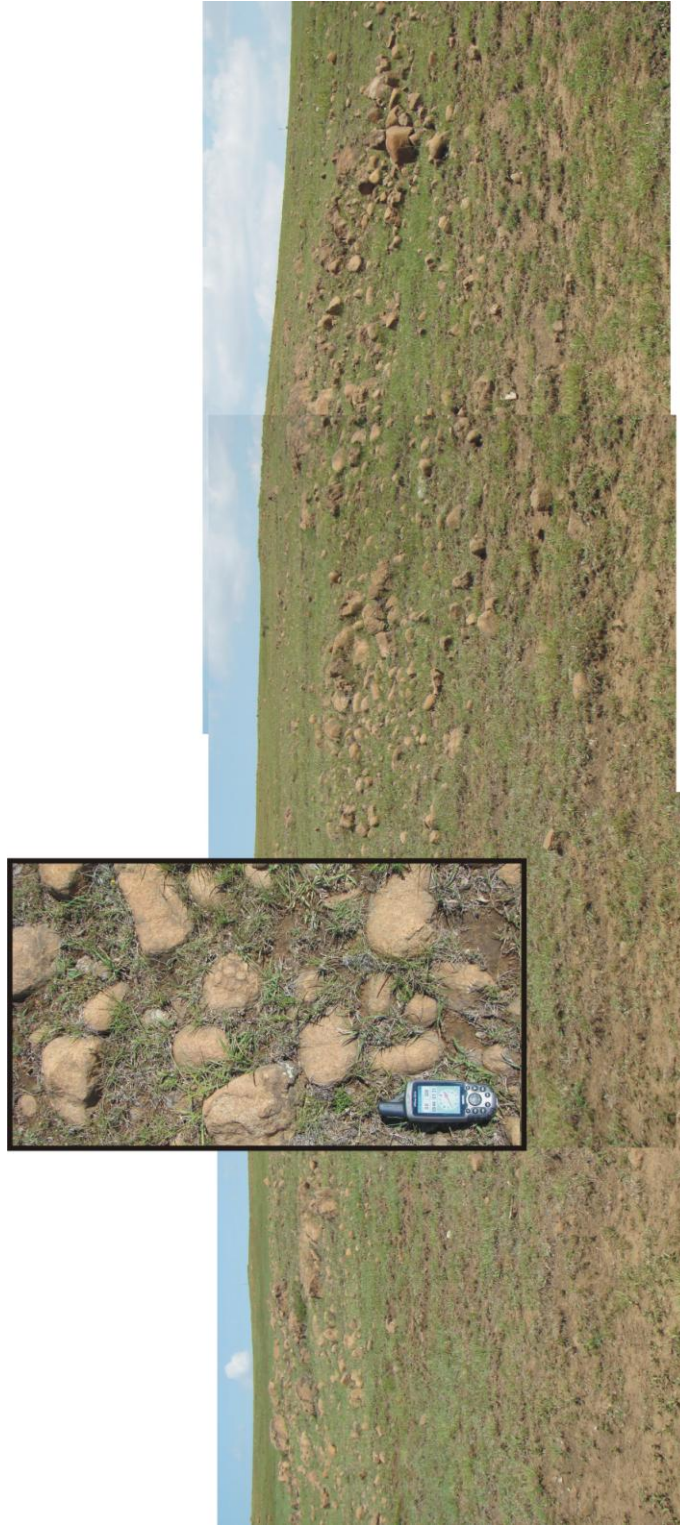


Figure 6. The study area is completely underlain by Jurassic dolerite intrusions.

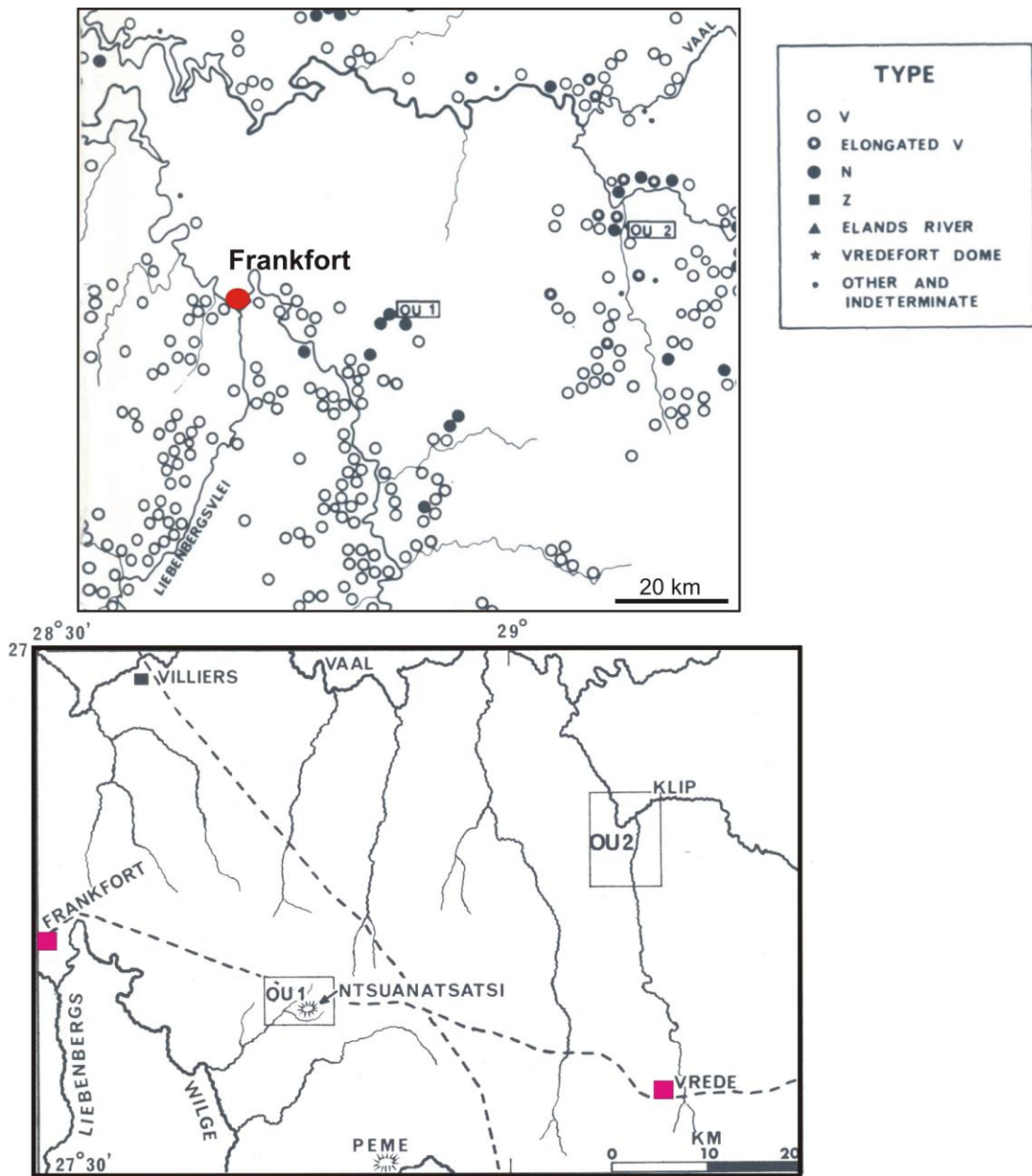


Figure 8. Distribution of Iron Age stone settlement types in the vicinity of Frankfort (after Maggs 1976). The type site of Iron Age settlements in the region is named after Ntsuanatsatsi hill, which is situated between Frankfort and Vrede .

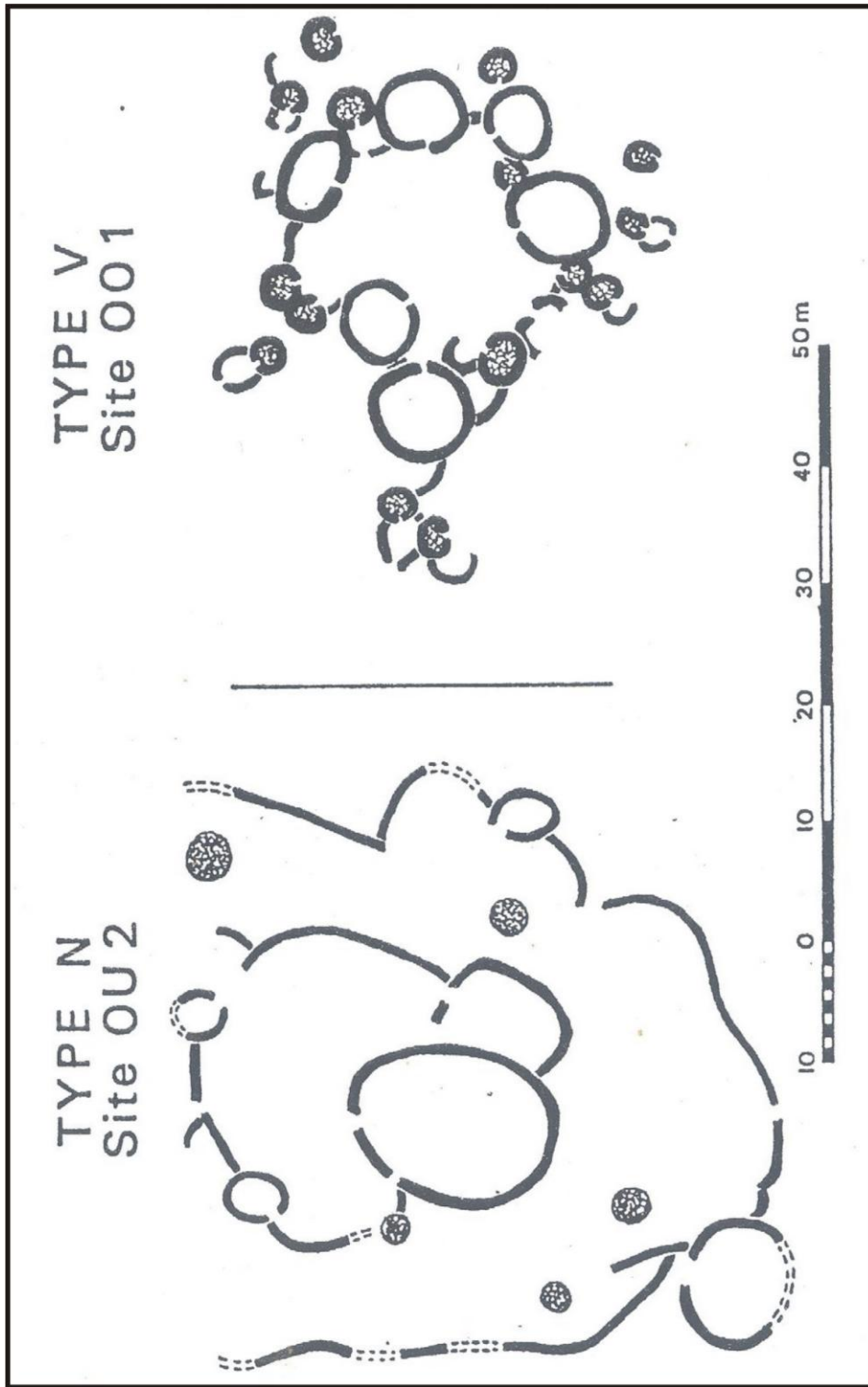


Figure 8. Iron Age settlement types found in the northeastern Free State (after Maggs 1976).



Figure 9. Modern structures recorded during the survey include a water reservoir, informal dwellings and kraals.