

**Phase 1 Heritage Impact Assessment of the 40693
Namahadi / Frankfort WWTW, Frankfort, Free State
Province**



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Executive Summary

At the request of MDA Environmental Consultants in Bloemfontein, a Phase 1 Heritage Impact Assessment was conducted for the 40693 Namahadi / Frankfort WWTW, consisting of a 1.5 km long water pipe line and new pump station at Frankfort in the Free State Province. The field assessment shows that the footprint is located within a previously disturbed and built-up environment. There is no evidence of intact Quaternary fossil exposures within the well-developed overbank sediments flanking the footprint along the Wilge River. Normandien Formation outcrop is visible where the pipe line crosses a small tributary to the north, but no evidence of intact fossil remains have been recorded along this section during the foot survey. The footprint is primarily underlain by palaeontologically insignificant dolerite intrusions near the Namahadi Township.

Palaeontological impact resulting from this particular development is considered low. However, any exposure of previously capped / intact fossil material from *in situ* sedimentary bedrock (Normandien Formation) should be reported to SAHRA at the appropriate time, so that possible intact finds may be recorded, mapped and removed. The palaeontological component is therefore rated as Generally Protected B (GP.B). 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, or material of cultural significance within the confines of the development footprint. The archaeological and cultural component of proposed footprint is assigned a site rating of General Protection C (GP C).

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Introduction

At the request of MDA Environmental Consultants in Bloemfontein, a Phase 1 Heritage Impact Assessment was conducted for the 40693 Namahadi / Frankfort WWTW, consisting of a 1.5 km long water pipe line and new pump station at Frankfort in the Free State Province (**Fig. 1 & 2**). The site visit and subsequent assessment took place in April 2015.

The region's unique and non-renewable archaeological and palaeontological 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 including archaeological and palaeontological sites in the area to be developed, and that make recommendations for protection or mitigation of the impact of the sites.

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.

The Act 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 of development listed in Section 38 (1) of the NHR Act are:

- The construction of a road, wall, power line, pipe line, 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;
- Exceeding 5000 m² in extent;

- Involving three or more existing erven or subdivisions thereof;
- Involving three or more subdivisions thereof which have been consolidated within the past five years;
- Costs of which will exceed a sum set in terms of regulations by the South African Heritage Resources Agency (SAHRA).
- The rezoning of a site exceeding 10 000 m².
- Any other category of development provided for in regulations by the South African Heritage Resources Agency (SAHRA).

Methodology

The archaeological and palaeontological 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 information, geological maps, aerial photographs (Google Earth) and site records were consulted and integrated with data acquired during the on-site inspection.

The task also involved identification and assessment of possible archaeological heritage within the proposed project area, in accordance with section 9(8) and appendix 6 (“Specialist reports”) of the NEMA EIA Regulations, 2014 , whereby the specialist report takes into account the following 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.

The study area is rated according to field rating categories as prescribed by SAHRA (**Table 1**)

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. 2**):

A) 27°16'23.48"S 28°29'27.83"E

B) 27°16'15.88"S 28°29'32.72"E

C) 27°16'12.41"S 28°29'35.12"E

D) 27°16'6.61"S 28°29'35.98"E

E) 27°16'7.06"S 28°29'42.99"E

F) 27°15'50.26"S 28°29'45.04"E

G) 27°15'46.40"S 28°29'53.78"E

The proposed footprint consists of a new pipe line that will run along the bank of the Wilge River through a built-up area (**Fig. 2 A-E**), and about 500 m next to an existing road to connect to a proposed new pump station that is located at the southwestern boundary of the Namahadi Township (**Fig. 2, E-G; Fig. 3**).

Geology

The geology of the region has been described by Muntingh (1989) and is lithostratigraphically subdivided into the Volksrust Formation (Ecca Group) and Normandien Formation (Beaufort Group). From oldest to youngest, the geology underlying the footprint is primarily made up of Late Permian, Normandien Formation sandstones and Jurassic dolerite intrusions (Jd, Karoo Dolerite Suite). Quaternary alluvial deposits are well-developed along the Wilge River (**Fig. 4**).

Background

Biostratigraphically, the rocks belonging to the Normandien Formation are assigned to the Dicynodon Assemblage Zone (AZ). This 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.

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. 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. 5**). 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. 6**). 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

The field assessment shows that the footprint is located within a previously disturbed and built-up environment. There is no evidence of intact Quaternary fossil exposures within the well-developed overbank sediments flanking the footprint along the Wilge River (**Fig. 7**). Normandien Formation outcrop is visible where the pipe line crosses a small tributary to the north, but no evidence of intact fossil remains have been recorded along this section during the foot survey (**Fig. 8**).

The footprint is primarily underlain by palaeontologically insignificant dolerite intrusions near the Namahadi Township (**Fig. 9**).

No evidence of intact or capped Stone Age artefacts, Iron Age structures or fossil exposures were identified 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.

Impact Statement and Recommendations

Significance of impacts is summarized in **Table 1**. Palaeontological impact resulting from this particular development is considered low. However, any exposure of previously capped / intact fossil material from *in situ* sedimentary bedrock (Normandien Formation) should be reported to SAHRA at the appropriate time, so that possible intact finds may be recorded, mapped and removed. The palaeontological component is therefore rated as Generally Protected B (GP.B). 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, or material of cultural significance within the confines of the development footprint. The archaeological and cultural component of proposed footprint is assigned a site rating of General Protection C (GP 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.
- Kitching, J.W. 1995. Biostratigraphy of the *Dicynodon* Assemblage Zone IN B.S. Rubidge (ed.) *Biostratigraphy of the Beaufort Group*. Biostrat. Ser. S.Afr. Comm. Strat. 1, 29 – 34.
- Maggs T. M. O’C 1976. *Iron Age Communities of the Southern Highveld*. Occasional Publications of the Natal Museum No. 2. Natal Museum, Pietermaritzburg.
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- Rubidge, B. S. 1995. (ed.) *Biostratigraphy of the Beaufort Group*. Biostrat. Ser. S.Afr. Comm. Strat. 1, 1 – 45.

Tables & 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

Table 2. Summary of potential impacts along the proposed footprint.

Rock type / Age	Duration and extent of Development	Palaeontological significance	Archaeological significance	Palaeontological Impact resulting from the development	Archaeological Impact resulting from the development
Alluvium (Wilge River) (Quaternary)	Permanent Local	Medium - Low	Medium - High	None	None
Dolerite Suite, <i>Jd</i> (Jurassic)	Permanent Local	Low	Medium- Low	None	None
Normandien Formation Sandstone (<i>Pn</i>) (Permian)	Permanent Local	Medium - High	Low	Low	None

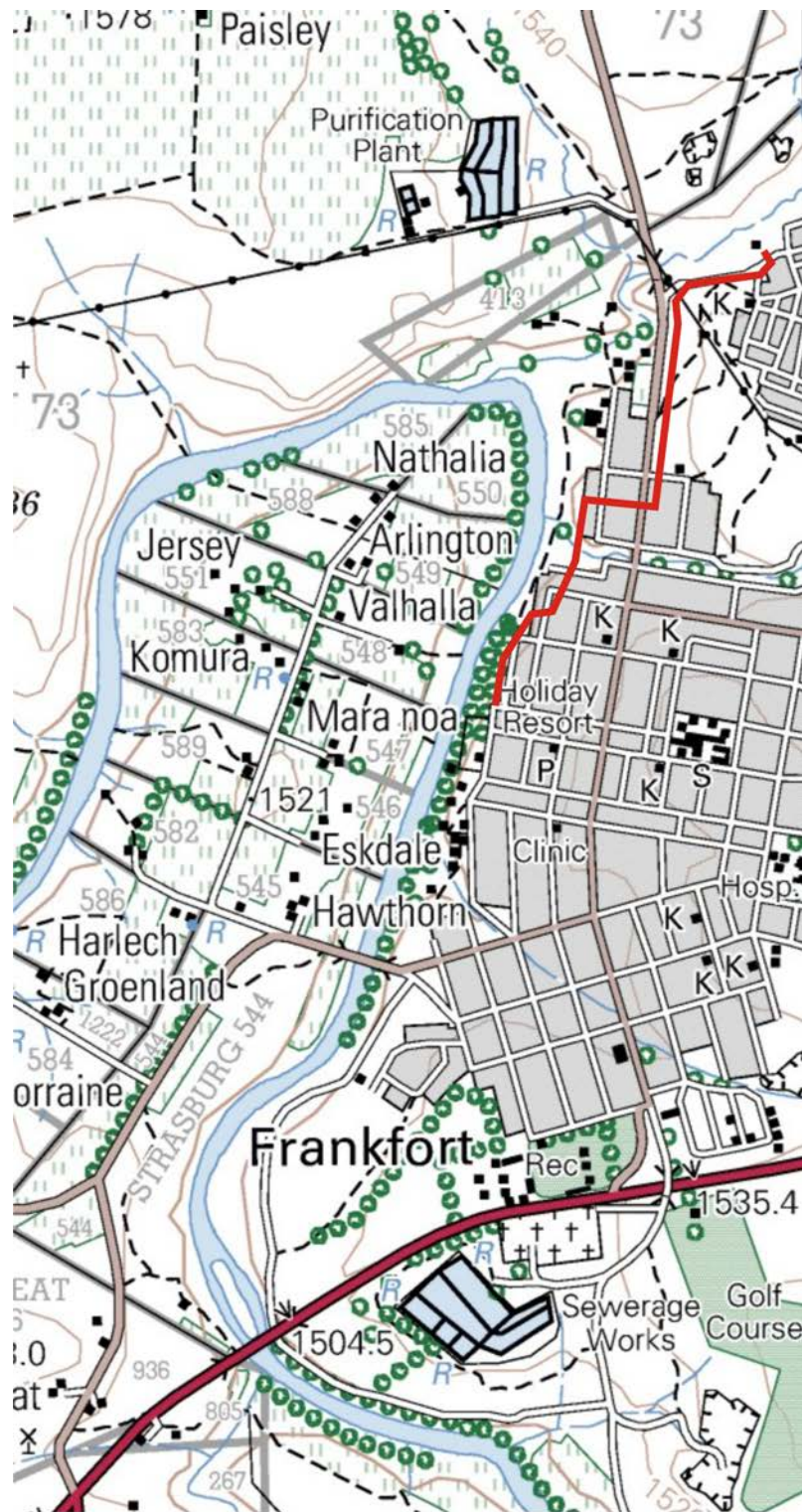


Figure 1. Map of the study area marked by red line (portion of 1:50 000 scale topographic map 2728 AD Frankfort).



Figure 2. Aerial view of the pipe line footprint.



Figure 3. The pipe line will be located within a previously disturbed and built-up environment.

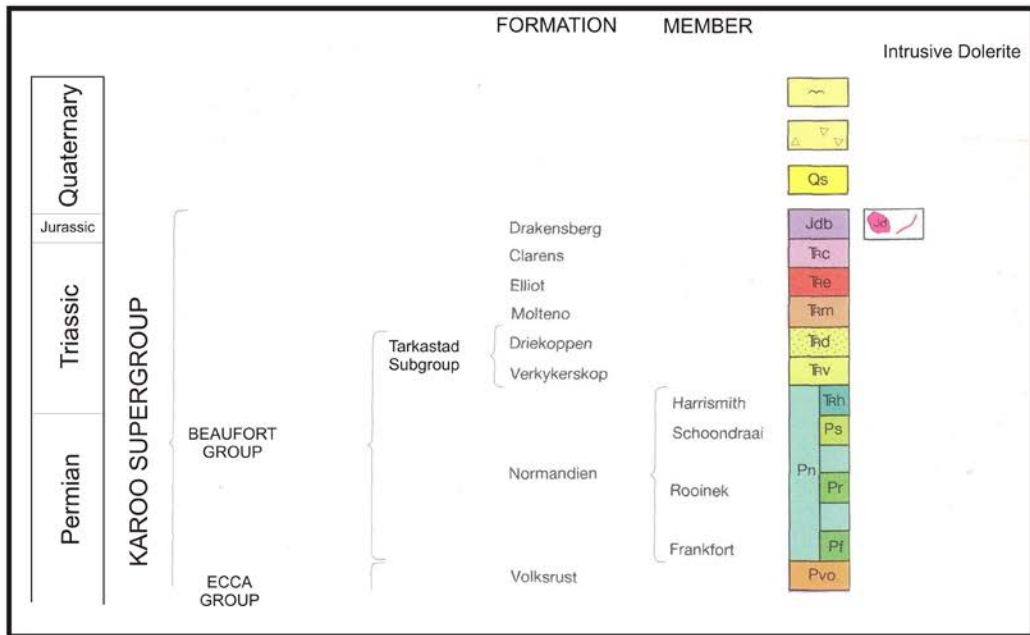
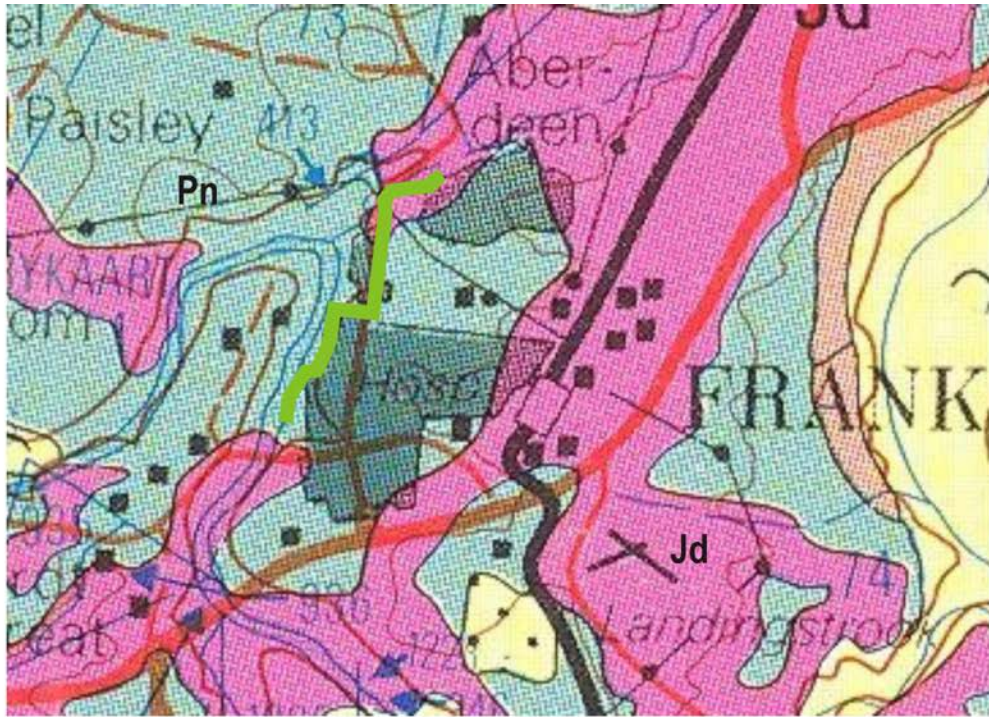


Figure 4. Portion of 1:250 000 scale geological map 2728 Frankfort. From oldest to youngest, the geology around the affected area is made up of Eccca Group shales, Permo-Triassic sandstones (Normandien Formation, *Pn*, Beaufort Group), Jurassic dolerite intrusions (*Jd*, Karoo Dolerite Suite) and superficial sediments of Quaternary age, made up of residual soils and alluvium (flying bird symbol).

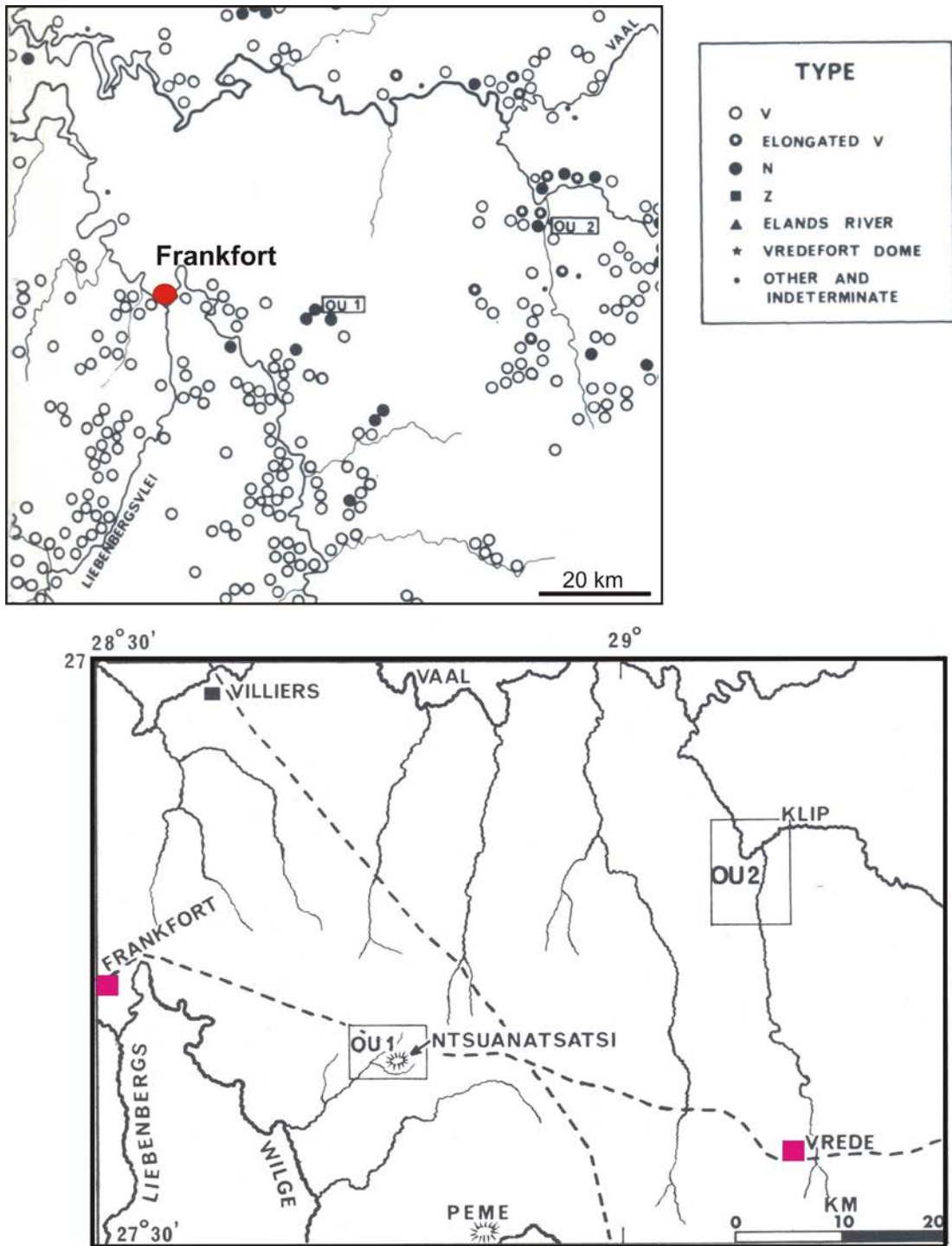


Figure 5. Distribution of Iron Age stone settlement types in the vicinity of Frankfort (after Maggs 1976). The type site of Iron Age settlements in the region is named after Ntsuanatsatsi hill, which is situated between Frankfort and Vrede .

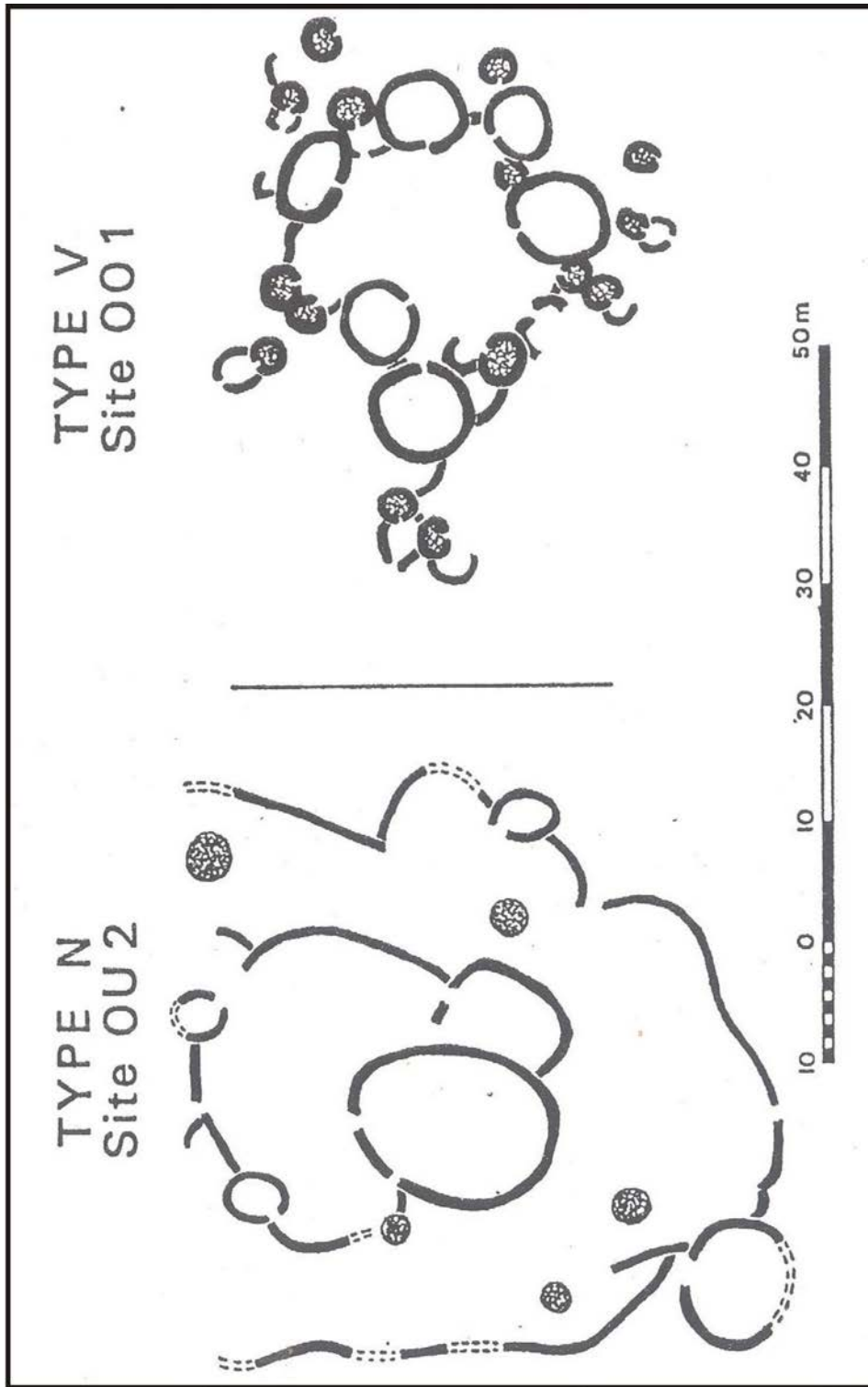


Figure 6. Iron Age settlement types found in the northeastern Free State (after Maggs 1976).



Figure 7. Intact overbank sediments along the Wilge River (top) capped by moderately disturbed sediments and residual soils (bottom).



Figure 8. Normandien Formation outcrop (top) and recent aluvial deposits (bottom), where the pipe line crosses a small tributary, looking north.



Figure 9. The footprint area near the Namahadi township is primarily underlain by weather-resistant dolerite intrusions capped by geologically recent topsoils.