Phase 1 Heritage, Archaeological and Palaeontological Impact Assessment for the proposed new 422 m - long Gryppoort-Klipfontein power line near Danielskuil, NC Province.

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Summary

A Phase 1 Heritage Impact Assessment was carried out for the proposed new 422 m long Gryppoort-Klipfontein power line on Farm 247 near Danielskuil in the Northern Cape Province. A foot survey of the terrain revealed no evidence for the accumulation and preservation of stromatolites within dolomitic limestone exposures observed along the south - north axis of the footprint. Tertiary surface limestones are randomly exposed near the northern boundary, but are mostly covered by a downwasted pebbly rubble and reddish-brown wind-blown sand matrix along the east-west axis of the footprint. There were no signs of intact fossil material within any of the exposed surface limestones and unconsolidated (superficial) Quaternary sediments. Potential palaeontological impact resulting from access to the proposed site, as well as the installation of pylons to support the new 422 m long power line is regarded as low. No further palaeontological studies are required for now, but it is advised that any excavations larger than 1 m^2 that exceeds depths of >1 m into unweathered dolomite bedrock, will need monitoring by a professional palaeontologist during the construction phase of the development when fresh exposures can be inspected for microfossil-bearing dolomite. 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 few isolated stone tools (1 small biface and 2 informal flakes), the pedestrian survey revealed no indication of *in situ* Stone Age archaeological material, capped 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 linear footprint. A post – 1960's farmstead is located about 500 m southwest of the development footprint. It will not be impacted by the proposed development. Although the site is located within a region known to be rich in historical and archaeological heritage, the linear footprint itself is not considered to be archaeologically sensitive and is assigned a site rating of Generally Protected C (GP.C). As far as the cultural and 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

At the request of SIVEST Environmental Consultants, a Phase 1 Heritage Impact Assessment was carried out for a proposed new 422 m long Gryppoort-Klipfontein power line on Farm 247 near Danielskuil 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.

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 (**Table 1**). 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 may involve site-significance classification standards as prescribed by SAHRA (**Table 2**). 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: 2823 BA Danielskuil

1 : 250 000 scale geological map 2822 Postmasburg

Site coordinates:

A) 28° 6'54.66"S 23°41'42.47"E

B) 28° 6'47.31"S 23°41'45.48"E

C) 28° 6'44.35"S 23°41'39.82"E

The development footprint consists of a new 422 m long power line to be constructed on Farm 247, which is situated about 17 km northeast of Danielskuil (**Fig. 2**).

Background

Geology

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; Harding 2004; Erikson *et al*. 2006) (**Fig. 3 & 4**).

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; Klein *et al*. 1987; Altermann & Schopf 1995). The banded iron formations (BIF) of the Kuruman Formation reflect significant early Proterozoic environmental conditions following massive iron deposition as a result of the build-up of free O^2 in the oceans by cyanobacterial photosynthesis. A major cold episode as a result of the resulting net removal of atmospheric CO^2, culminating in a glacial maximum at the Makganyene Formation diamictites (Postmasburg Group), is interpreted as evidence for major early Proterozoic glaciations at low palaeolatitudes around 2.4 Ga (De Villiers and Visser 1977; Moore *et. al* 2001). Shallow marine and lacustrine stromatolites and organic-walled microfossils preserved within Transvaal Supergroup dolomites of the Ghaap Plateau, 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.

The Precambrian dolomites at the eastern edge of the Ghaap Plateau have been incised at various points by drainage lines that created gorges in which travertine deposits have formed. As a result, the tufas at Norlim (Buxton) near Taung contain solution caves which are fossiliferous, including the one within the Thabaseek Tufa that produced the type specimen of *Australopithecus australis* (**Fig. 5**). Situated about 600m north-west of the *A. australis* type site, another solution cavity called Equus Cave yielded the Quaternary fossil remains of more than 40 mammalian species, including the extinct taxa *Equus capensis*, *Antidorcas bondi* and *Megalotragus priscus*. To the southeast, the lower Vaal River basin and its tributaries represent important repositories of late Neogene fossil remains. Dating back to the late Cretaceous, the Vaal River is one of the principal fluvial conduits in southern Africa and its alluvial formations have yielded rare mammal fossils and stone tools so that at the turn of the 19th century, the Vaal River gravels represented the foremost fossil mammal locality in sub-Saharan Africa.

Cultural Heritage & Archaeology

The town of Danielskuil takes its name from a cone-shaped depression 6 m deep in the dolomitic limestone; with a domed covering, reminiscent of the biblical 'Daniel in the lion's den'. The Griqua leader Adam Kok is said to have used this depression as a prison, and to also have kept snakes in it. The area is known for rich asbestos deposits and for diamonds, while marble is also mined. The Tswana name of Danielskuil is *Tlaka le Tlou* or *Tlaka-lo-Tlou*, meaning 'elephant reed' (Raper 1984).

The region has yielded multiple Stone Age archaeological sites (**Fig. 5**). Several Early Stone Age (ESA) sites, containing Victoria West cores, handaxes and cleavers have been recorded along the Harts River, a tributary of the Vaal River, near Taung. Abundant ESA artefacts are known also from Kathu Pan, situated northwest of the town of Kathu. Wonderwerk Cave, situated halfway between Kuruman and Danielskuil, is also 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. Holocene deposits containing LSA artefacts are known from the rock shelters Blue Pool Cave, Ochre Cave, Powerhouse Cave, Witkrans Cave, Little Witkrans and Black Earth Cave, which are also located in Ghaap Plateau travertine at Norlim (Taung). 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 Doornfontein and Paling M87, open mining pits at Gloucester 13 and Mount Huxley, as well as open mining pits next to the town reservoir. The most famous mining site is Blinkklipkop (Gatkoppies), situated about 5 km northeast of Postmasburg (**Fig. 5 & 7**). 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*. An ancient specularite mine at Doornfontein (Doornfontein 1) has a maximum length of over 100 m and consists of four interlinked chambers (Beaumont & Boshier 1974) (**Fig. 5 & 7**). It was estimated that over 36 million kilograms of specularite had been removed from the entire workings. Excavations yielded mining tools including stone artefacts, various types of pottery, bone arrowheads, and hundreds of ostrich eggshell beads (**Fig. 8**). 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.

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. The area was previously occupied by Tswana-speaking (Tlhaping and Tlharo) communities who occupied the Langeberg region throughout the late 18th century. The Tlhaping and

Tlharo branches, who entered the northern Cape from the north at the beginning of the 17th century, reached as far south as Majeng (Langeberg), Tsantsabane (Postmasburg) and Tlhake le Tlou (Danielskuil) by the beginning of the 18th century (Snyman 1986). A large Thlaping settlement was established at Nokaneng, about 40 km southwest of Olifantshoek, while the Tlharo largely occupied the Langeberg region between Ditlou (Olifantshoek) and Dibeng (Deben) (Maingard 1933). After clashes with the Koranna, who moved into the area after 1770, the Tlhaping and Tlharo temporarily abandoned Nokanna and the Langeberg at around 1790 to settle around Dithakong near Kuruman, only to return again to the Langeberg at the beginning of the 19th century (Humphreys 1976). At the time of the 1801-1803 Borcherds and Somerville expedition, Dithakong was an important BaTlhaping capital **(Fig. 5 & 10**). It was calculated that the number of huts there were at least not less than 1 500 and the number of occupants at somewhere between 8 000 and 25 000 (Maingard, 1933; Beaumont 1983; Morris 1990). Extensive stone wall enclosures are found on the adjacent hills and archaeological investigations during the 1980's have revealed that the ruins were built during the 15th century A.D. and possibly by sedentary Khoi groups. The area consists of primary and secondary enclosures and cover a total area of about 1 km^2 comprising hundreds of circles of varying size. With the annexation of the region south of the Molopo and north of Griqualand West by the British in 1885, the area became known as British Bechuanaland.

Rock art sites in the region, including rock engraving as well as paintings, are known from Wonderwerk Cave (paintings) and the Danielskuil Townlands (engravings).

Field Assessment

Palaeontology

A foot survey of the terrain revealed no evidence for the accumulation and preservation of stromatolites within dolomite exposures observed along the south - north axis of the footprint (point A to B in **Fig 2**; **Fig. 11 & 12**). Tertiary surface limestones are randomly exposed near the northern boundary, but are mostly covered by a downwasted pebbly rubble and reddish-brown wind-blown sand matrix along the east-west axis of the footprint (point B to C in **Fig. 2; Fig. 13**). There were no signs

of intact fossil material within any of the exposed surface limestones and unconsolidated (superficial) Quaternary sediments.

Cultural Heritage & Archaeology

Except for a few isolated stone tools (1 small biface and 2 informal flakes), the pedestrian survey revealed no indication of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape (**Fig. 14**). 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 linear footprint. A post – 1960's farmstead is located about 500 m southwest of the development footprint on Portion 1 of Farm 248, the latter being originally surveyed in 1878, with the title deed dated to 1882 and Portion 1 surveyed in 1957 (**Fig. 15 & 16**). It will not be impacted by the proposed development.

Impact Statement & Recommendations

Potential palaeontological impact resulting from access to the proposed site, as well as the installation of pylons to support the new 422 m long power line is regarded as low. However, it is noted that as a carbonate rock, limestone and dolomite can be highly reactive when exposed to acids or even mildly acidic rain water, which could lead to substantial deterioration over time. No further palaeontological studies are required for now, but it is advised that

- any excavations larger than 1 m^2 that exceeds depths of >1 m into unweathered dolomite bedrock, will need monitoring by a professional palaeontologist during the construction phase of the development when fresh exposures can be inspected for microfossil-bearing dolomite. In the event of fossil exposure, a professional palaeontologist must confirm and record the finds and follow appropriate mitigation procedures where necessary. The palaeontologist must apply for a valid collection / removal permit from SAHRA if fossil material is found during the construction phase of the development.
- if, in the unlikely event that localized fossil mammal material are discovered within the superficial surface limestone deposits during the construction phase of the project (i.e. modern-looking but more or less lithified animal bones and teeth), it is recommended that a professional palaeontologist be called in to record and remove the material. In the meantime, *ex situ* remains must be

wrapped in paper towels or heavy duty tin foil and stored in a safe place. The material should not be washed or cleaned in any way. *In situ* material must be kept in place and protected from further damage by covering it with light but rigid object like a box, bucket or metal sheet until further confirmation by the palaeontologist.

Potential archaeological impact resulting from access to the proposed sites, as well as the installation of pylons to support the new power lines is regarded as low. The sparsely distributed lithic component is considered secondary and has been recorded and mapped. Although the site is located within a region known to be rich in historical and archaeological heritage, the linear footprint itself is not considered to be archaeologically sensitive and is assigned a site rating of Generally Protected C (GP.C). As far as the cultural and archaeological heritage is concerned, the proposed development may proceed provided that all excavation activities are restricted to within the boundaries of the development footprint.

References

Altermann, W. & Schopf, J.W. 1995. Microfossils from the Neoarchaean Campbell Group, Griqualand West Sequence of the Transvaal Group, and their palaeoenvironmental and evolutionary implications. Precambrian Research 75: 65-90.

Beaumont. P. B. 1973. The ancient pigment mines of Southern Africa. South African Journal of Science. 69: 140-146.

Beaumont. P., & Boshier. A. 1974. Report on test excavations in a prehistoric pigment mine near Postmasburg. Northern Cape. South African Archaeological Bulletin, 29(113/114): 41-59.

Beaumont, P.B., 1990. Kathu Pan. In: Beaumont P.B., Morris D. (Eds.). *Guide to the Archaeological Sites in the Northern Cape*, McGregor Museum, Kimberley, pp. 101-134.

Beaumont, P.B., Vogel, J.C., 2006. On a timescale for the past million years of human history in central South Africa. *South African Journal of Science* 102, 217-228.

Beukes, N.J. 1980. Lithofacies and stratigraphy of the Kuruman and Griquatown ironformations, northern Cape Province, South Africa. Transactions of the Geological Society of South Africa 83: 69-86.

Beukes, N.J. 1983. Stratigraphie en litofasies van die Campbellrand-Subgroep van die proterofitiese Ghaap-Groep, Noord-Kaapland. Transactions of the Geological Society of South Africa 83: 141-170.

Chazan, M., *et al*. 2012. The Oldowan horizon in Wonderwerk Cave (South Africa): archaeological, geological, paleontological and paleoclimatic evidence. *Journal of Human Evolution* 63(6):859-66.

Dart, 1925 Australopithecus africanus: the man-ape of South Africa. *Nature* 115, 193 – 199.

Eriksson, P.G., Altermann, W. & Hartzer, F.J. 2006. The Transvaal Supergroup and its precursors. In: Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (Eds.) The geology of South Africa, pp. 237-260. Geological Society of South Africa, Marshalltown.

Fock, G.J. and Fock, D.M.L. 1984. *Felsbilder in Sudafrika: Kinderdam und Kalahari.* Köln. Böhlau Verlag.

Harding, C.J. 2004. *Origin of the Zeekoebaart and Nauga East high-grade iron ore deposits Northern Cape South Africa*. Unpublished MSc Thesis, Rand Afrikaans University.

Helgren, D.M. Acheulian settlement along the lower Vaal River, SA. *Journal of Archaeological Science* 5: 39 – 60.

Humphreys, A.J.B. 1976. Note on the Southern Limits of Iron Age Settlement in the Northern Cape. *South African Archaeological Bulletin* 31(121&122): 54 – 57.

Humphreys, A.J.B. 1978. The re-excavation of Powerhouse Cave and an assessment of Frank Peabody's work on Holocene Deposits in the Taung area. *Ann. of the Cape Prov. Museums (nat. Hist)* 2 (12): 217 – 244.

Kuman, K. 2001. An Acheulean factory site with prepared core technology near Taung, SA. *South African Archaeological Bulletin* 56(173&174): 8 – 22.

Maingard, L.F. 1933. The Brikwa and the ethnic origins of the BaTlaping. *South African Journal of Science* 30, 597 – 602.

Maggs, T.M.O'C. 1972. Bilobial dwellings: a persistant feature of Southern Tswana settlements. *SA Archaeological Soc. Goodwin Series* 1, 54 – 64.

Maggs, T.C. 1976. Iron Age communities of the southern Highveld. *Occasional Papers of the Natal Museum No. 2.*

Morris, D. 1990. Blinkklipkop and Doornfontein : Specularite Mines In: Beaumont P.B., Morris D. (Eds.). *Guide to the Archaeological Sites in the Northern Cape*, McGregor Museum, Kimberley, pp. 65 – 74.

Partridge, T.C. & Maud, R.R. 2000. *The Cenozoic of Southern Africa*. Oxford Monographs on Geology and Geophysics No. 40.

Thackeray, A.I., Thackeray, J.F., Beaumont, P.B., Vogel, J.C., 1981. Dated rock engravings from Wonderwerk Cave, South Africa. *Science* 214, 64-67.

Morris D. 1990. Water snakes and wagons: Rock engravings of the Ghaap Plateau and Kuruman Valley In: Beaumont P.B., Morris D. (Eds.). *Guide to the Archaeological Sites in the Northern Cape*, McGregor Museum, Kimberley, pp.135 – 142.

Snyman, P.H.R. 1986. Die Langeberg – rebellie en die totstandkoming van Olifantshoek. *Contree* 20: 16 – 26.

Thackeray, A.I., Thackeray, J.F., Beaumont, P.B. and Vogel, J.C., 1981. Dated rock engravings from Wonderwerk Cave, South Africa. *Science* 214, 64-67.

Truswell, J.F. & Eriksson, K.A. 1973. Stromatolite associations and their palaeoenvironmental significance: a reappraisal of a Lower Proterozoic locality in the North Cape Province, South Africa. *Sedimentary Geology* 10: 1-23.

Van Riet Lowe, C. 1941. Prehistoric art in SA. Archaeological Series No. 5. Bureau of Archaeology. Dept. Of the Interior, Pretoria.

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.

27/ 12 / 2017

Tables and Figures

Table 1: Relationship between different heritage contexts, heritage resources likely to occur within these contexts, and likely sources of heritage impacts in the central interior of South Africa.

Heritage Context	Heritage Resources	Impact
Palaeontology	Precambrian shallow marine and lacustrine stromatolites, organic-walled microfossils, Ghaap Plateau (Transvaal Supergroup) Palaeozoic and Mesozoic fossil remains, e.g. Karoo Supergroup Neogene regolith	Road cuttings Quarry excavation Bridge and pipeline construction (Quaternary alluvial deposits)
Archaeology Early Stone Age Middle Stone Age LSA - Herder Historical	Types of sites that could occur in the Free State include: Localized Stone Age sites containing artifacts, animal and human remains found near *inter alia* the following: River courses/springs Stone tool making sites Cave sites and rock shelters (e.g. Wonderwerk Cave) Freshwater shell middens Ancient, kraals and stonewalled complexes Abandoned areas of past human settlement Burials over 100 years old Historical dumps Structural remains Objects including industrial machinery and aircraft	Subsurface excavations including ground levelling, landscaping, foundation preparation, road building, bridge building, pipeline construction, construction of electrical infrastructure and alternative energy facilities, township development.
History	Historical townscapes Historical structures, i.e. older than 60 years Historical burial sites Places associated with social identity/displacement, e.g. Witsieshoek Cave Historical mission settlements, e.g. Bethulie, Beersheba	Demolition or alteration work. New development.
Natural Landscapes	Formally proclaimed nature reserves Evidence of pre-colonial occupation Scenic resources, e.g. view corridors, viewing sites, Historical structures/settlements older than 60 years Geological sites of cultural significance.	Demolition or alteration work. New development.
Relic Landscape Context	Battle and military sites, e.g Magersfontein Precolonial settlement and burial sites Historical graves (marked or unmarked, known or unknown) Human remains (older than 100 years) Associated burial goods (older than 100 years) Burial architecture (older than 60 years)	Demolition or alteration work. New development.

Table 2. 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

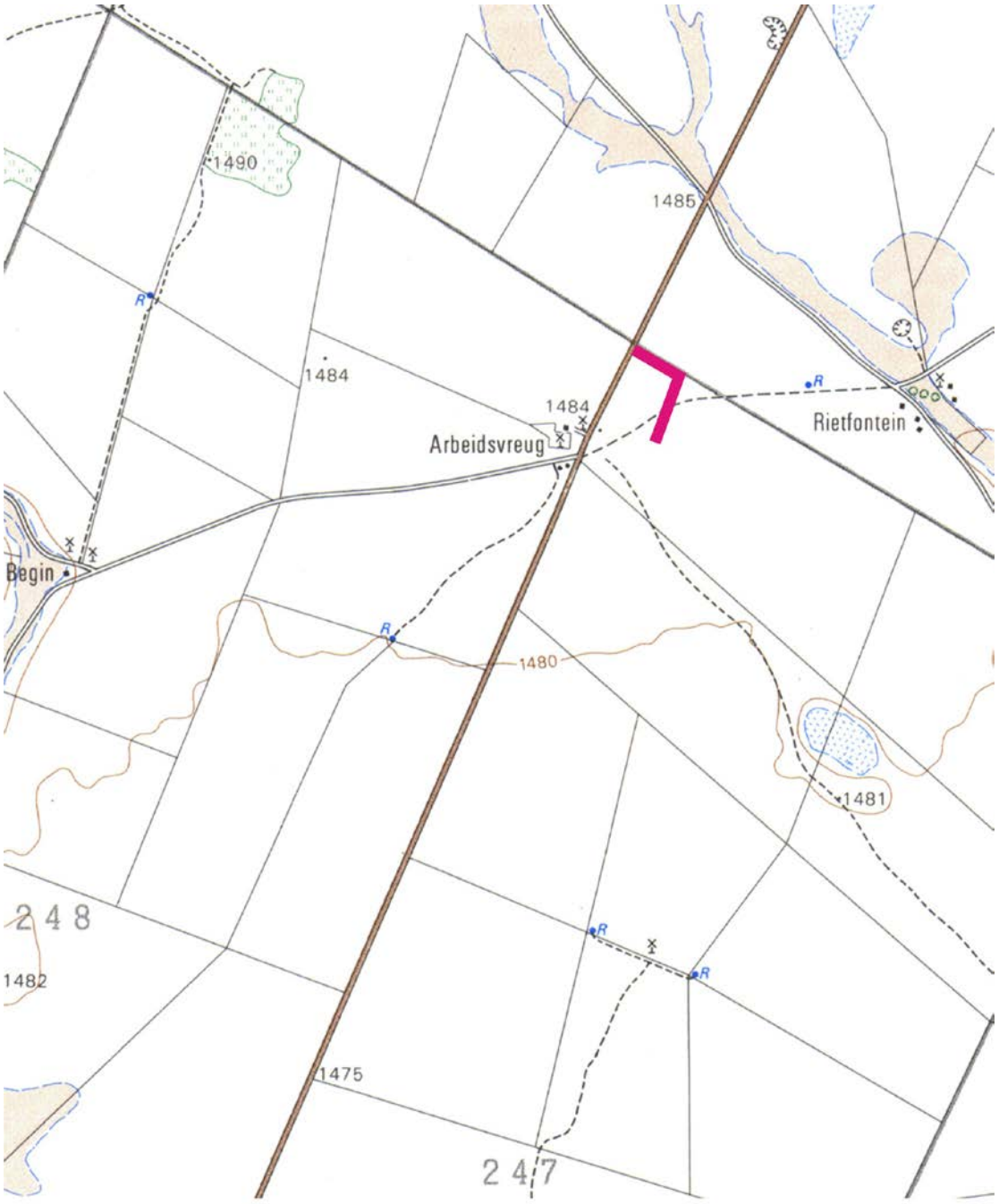


Figure 1. Map of the proposed new 422 m - long Gryppoort-Klipfontein power line footprint on Farm 247 near Danielskuil (portion of 1:50 000 scale topographic map 2823BA Danielskuil).

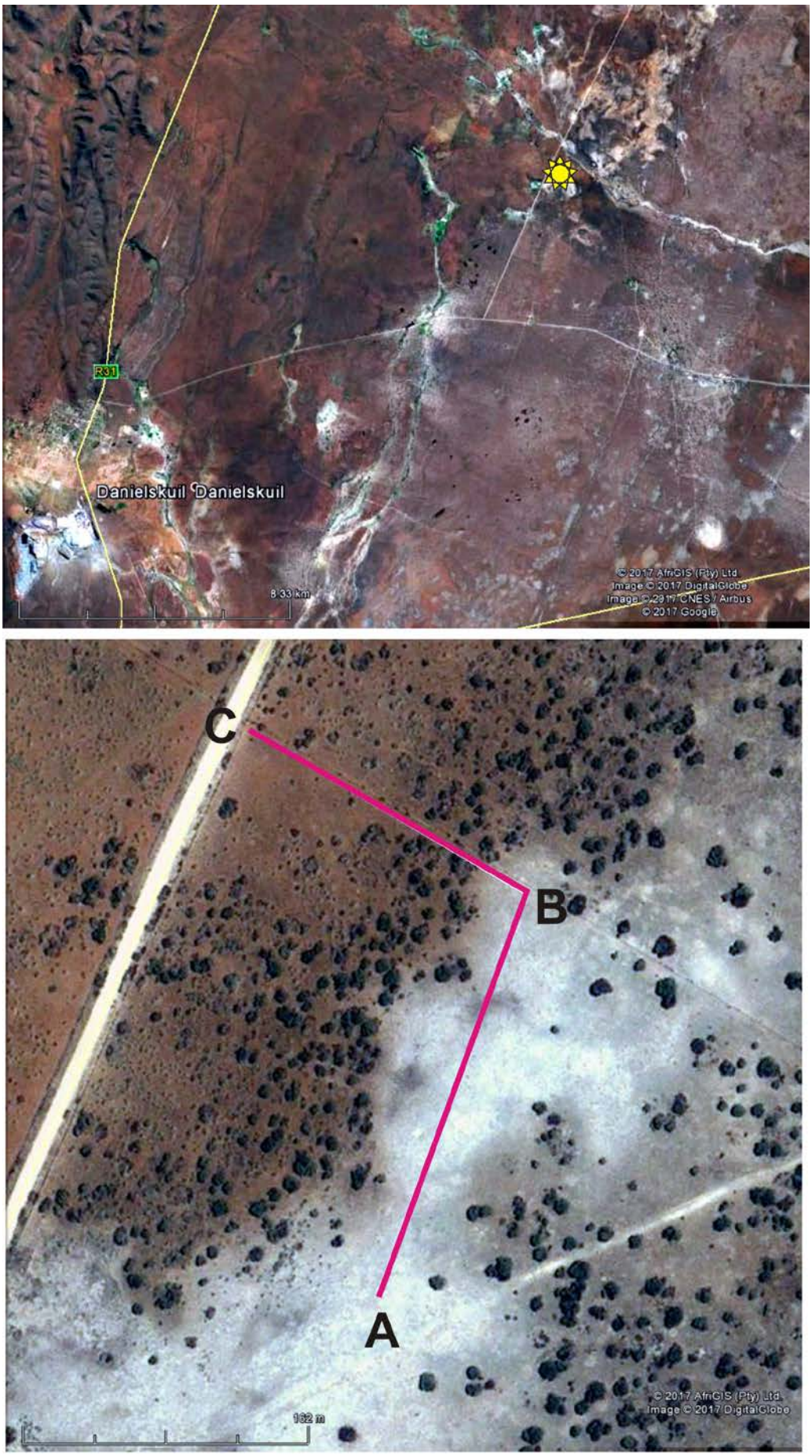


Figure 2. Aerial view (top, yellow star) and layout (below) of the development footprint.

Figure 3. According to the 1:250 000 scale geological map 2822 Postmasburg, the proposed development footprint (red star) is underlain by palaeontologically significant carbonate rocks of the ~2.5 Ga old Cambellrand Subgroup (*Vgl*, Ghaap Group, Transvaal Supergroup).

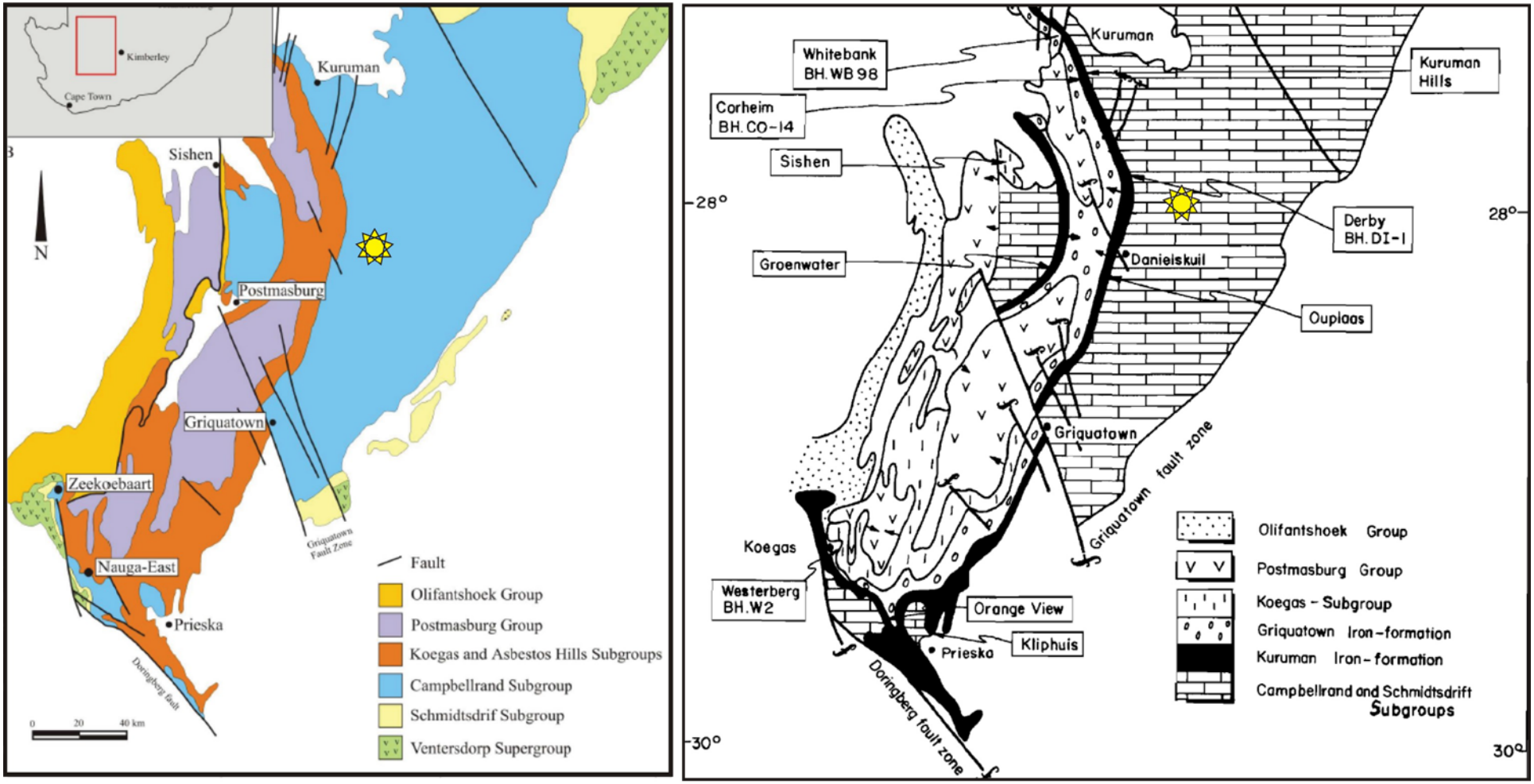


Figure 4. Regional geology according to Harding 2004 (left) and Beukes 1980 (right). Proposed new powerline footprint indicated by yellow star.

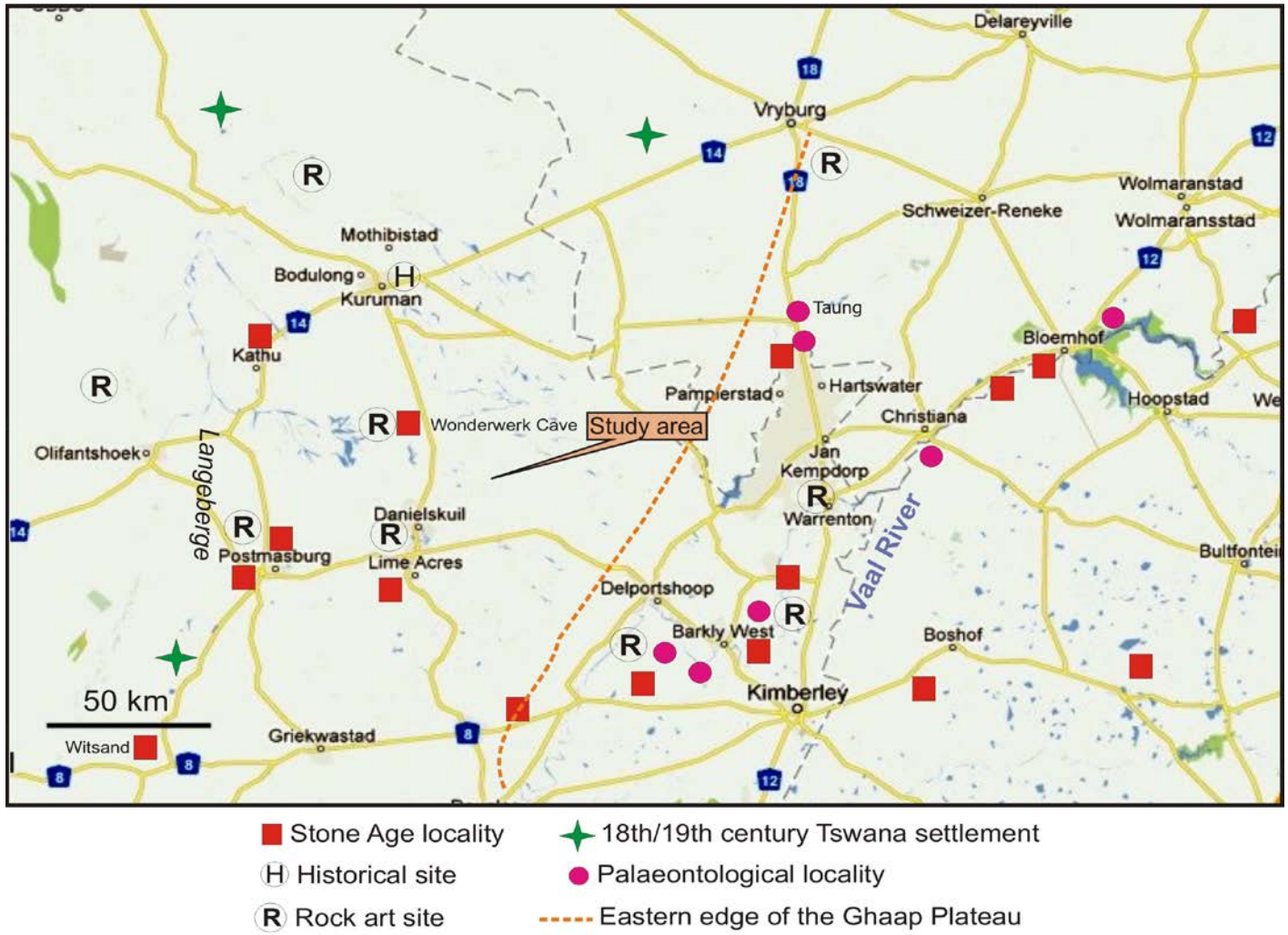


Figure 5. Major palaeontological and archaeological localities in the region

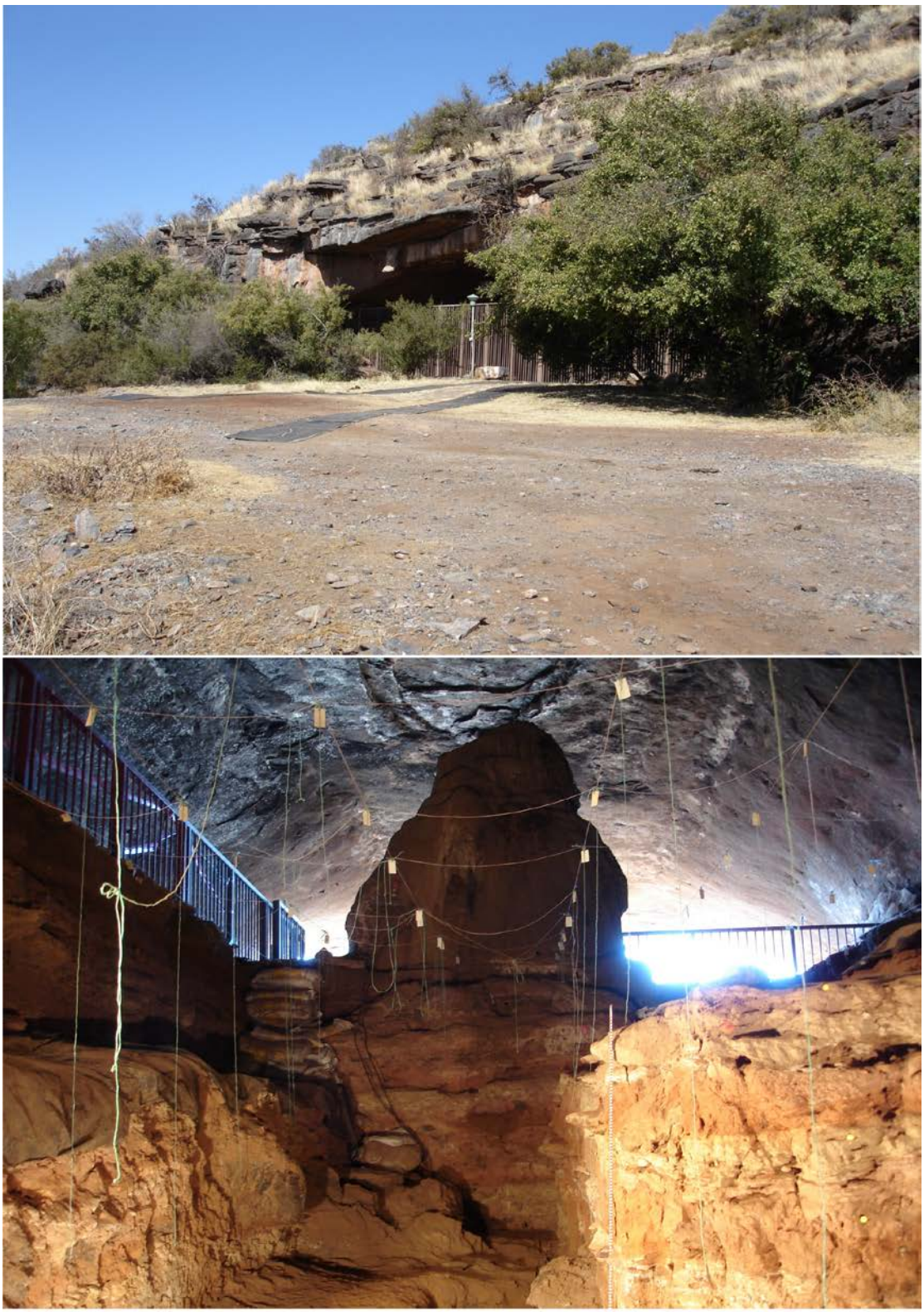


Figure 6. Entrance to Wonderwerk Cave (top) and looking out from inside the cave (below).

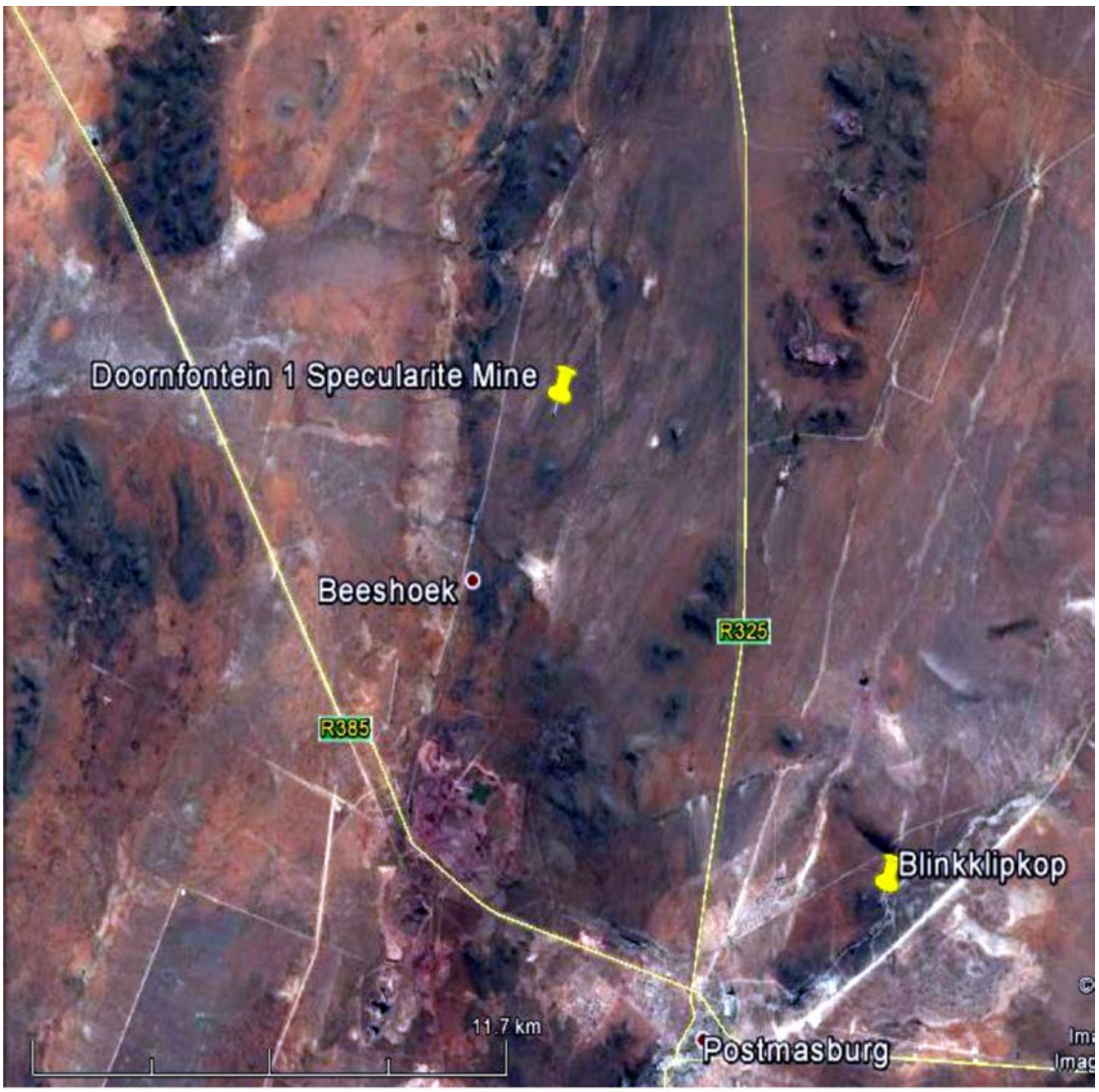
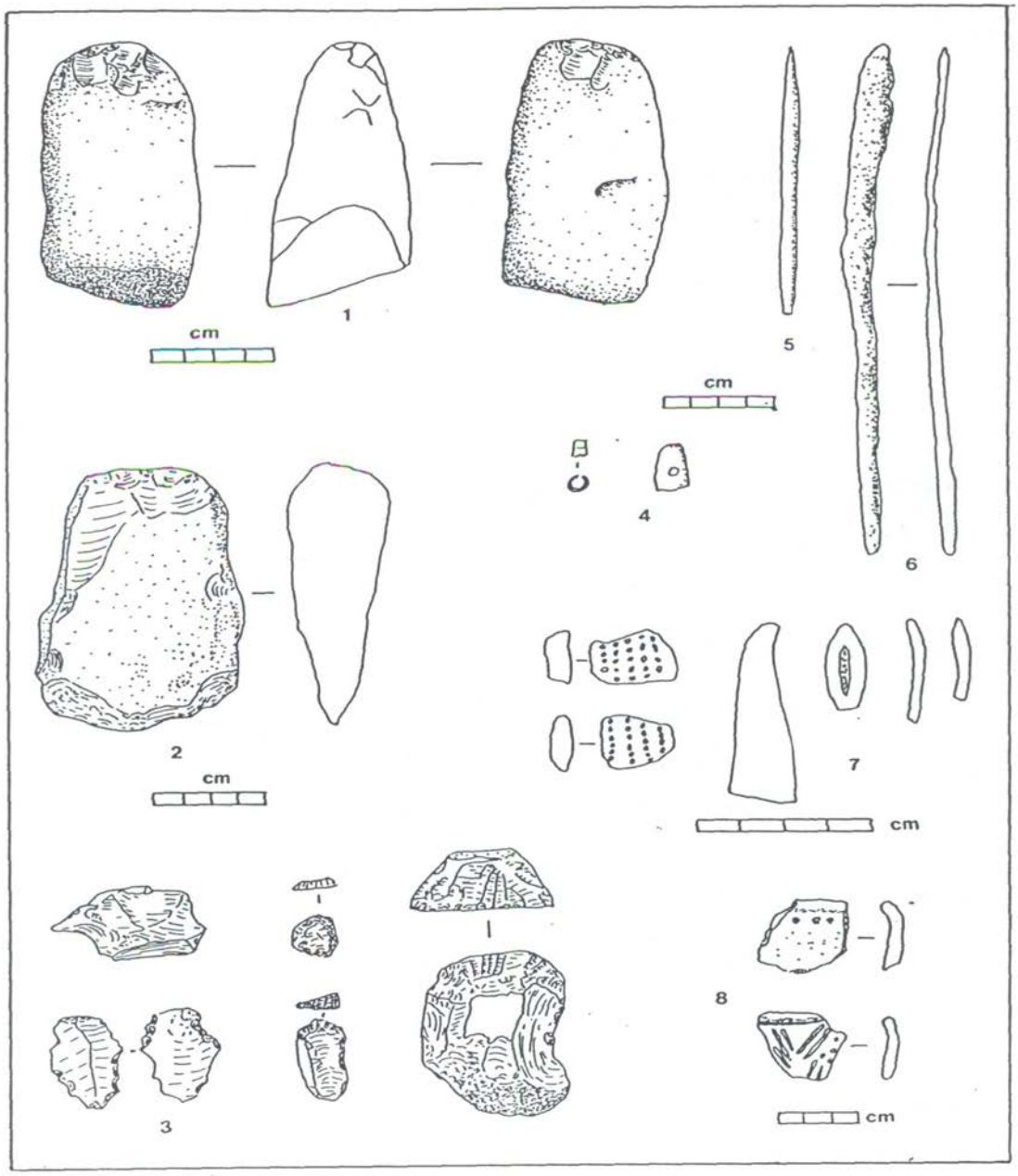


Figure 7. Aerial view of the Doornfontein and Blinkklipkop archaeological sites near Postmasburg.



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

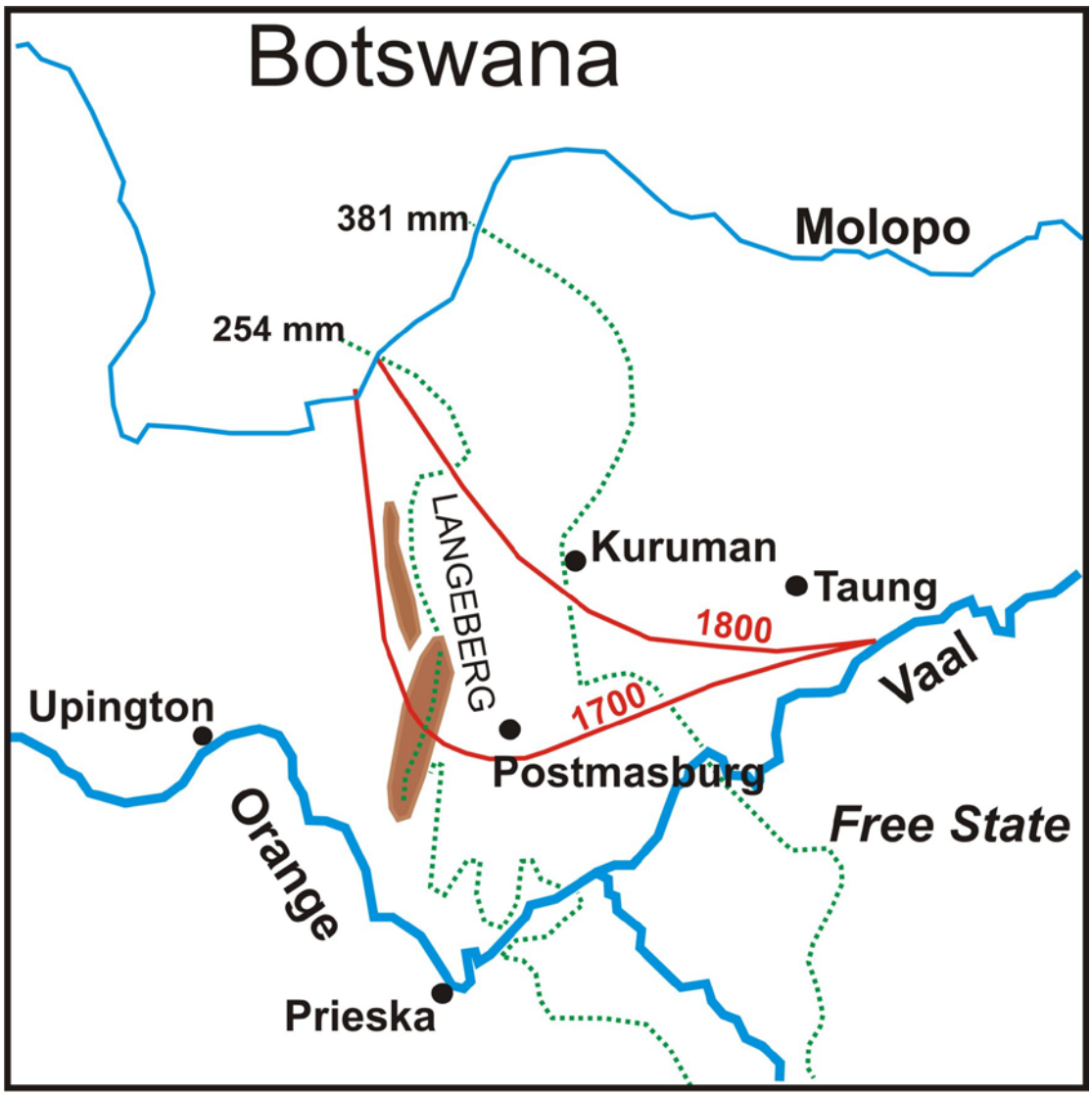


Figure 9 . Southern limits of Tswana settlement during the 18th and 19th centuries (after Humphreys 1976).

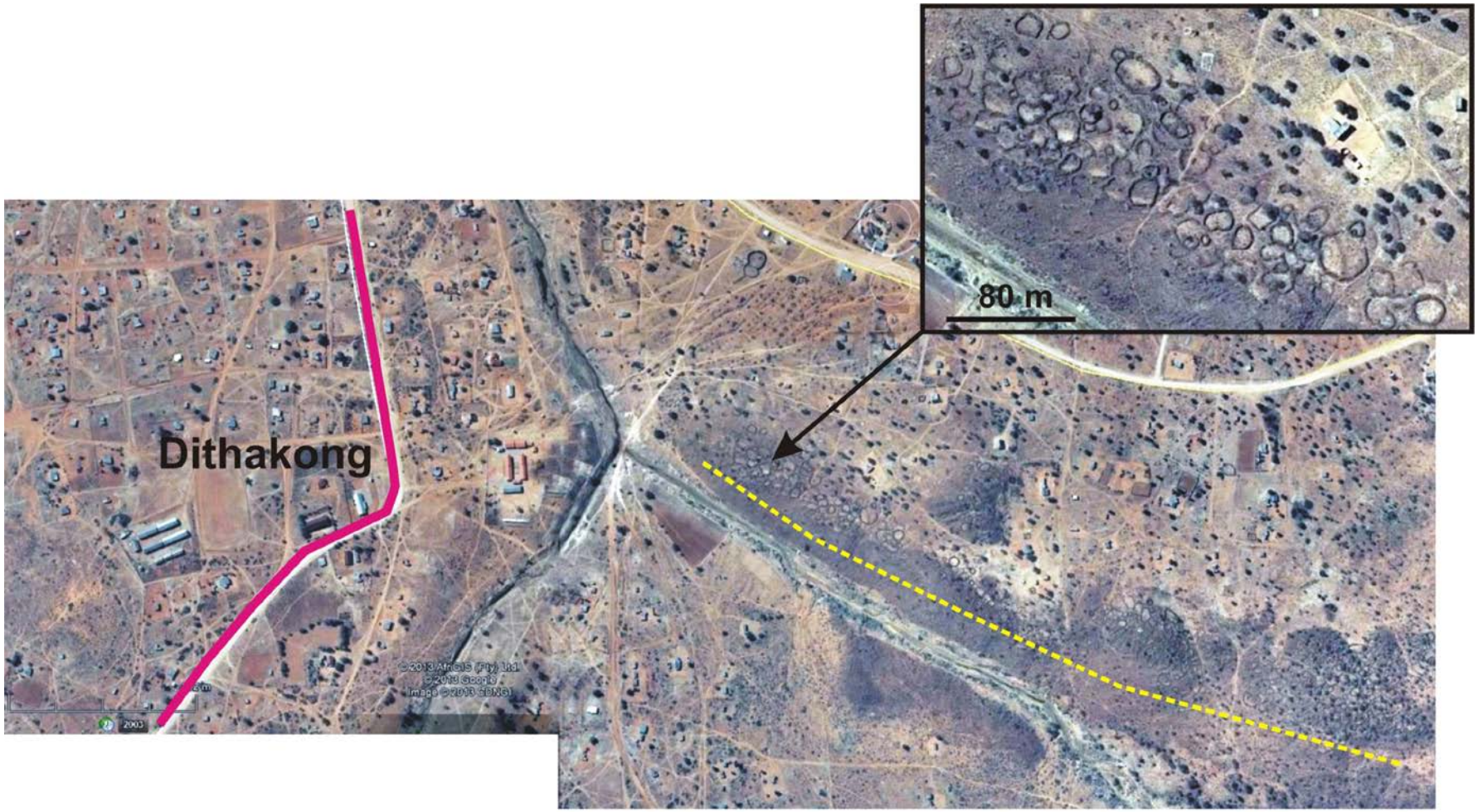


Figure10. Extensive stone wall enclosures are found near Dithakong and archaeological investigations during the 1980's have revealed that the ruins were built during the 15th century A.D.

Figure 11. General view of the footprint, looking north.

Figure 12. Dolomitic limestone exposed along the south-north axis of the footprint

Figure 13. Tertiary surface limestones exposed near the northern boundary (left), covered by a downwasted pebbly rubble and reddish-brown wind-blown sand matrix along the east-west axis of the footprint (below).

Figure 14. Uncapped and isolated ironstone biface.
Scale 1 = 10 cm.

Figure 15. The Arbeidsvreug farmstead on Farm 248.

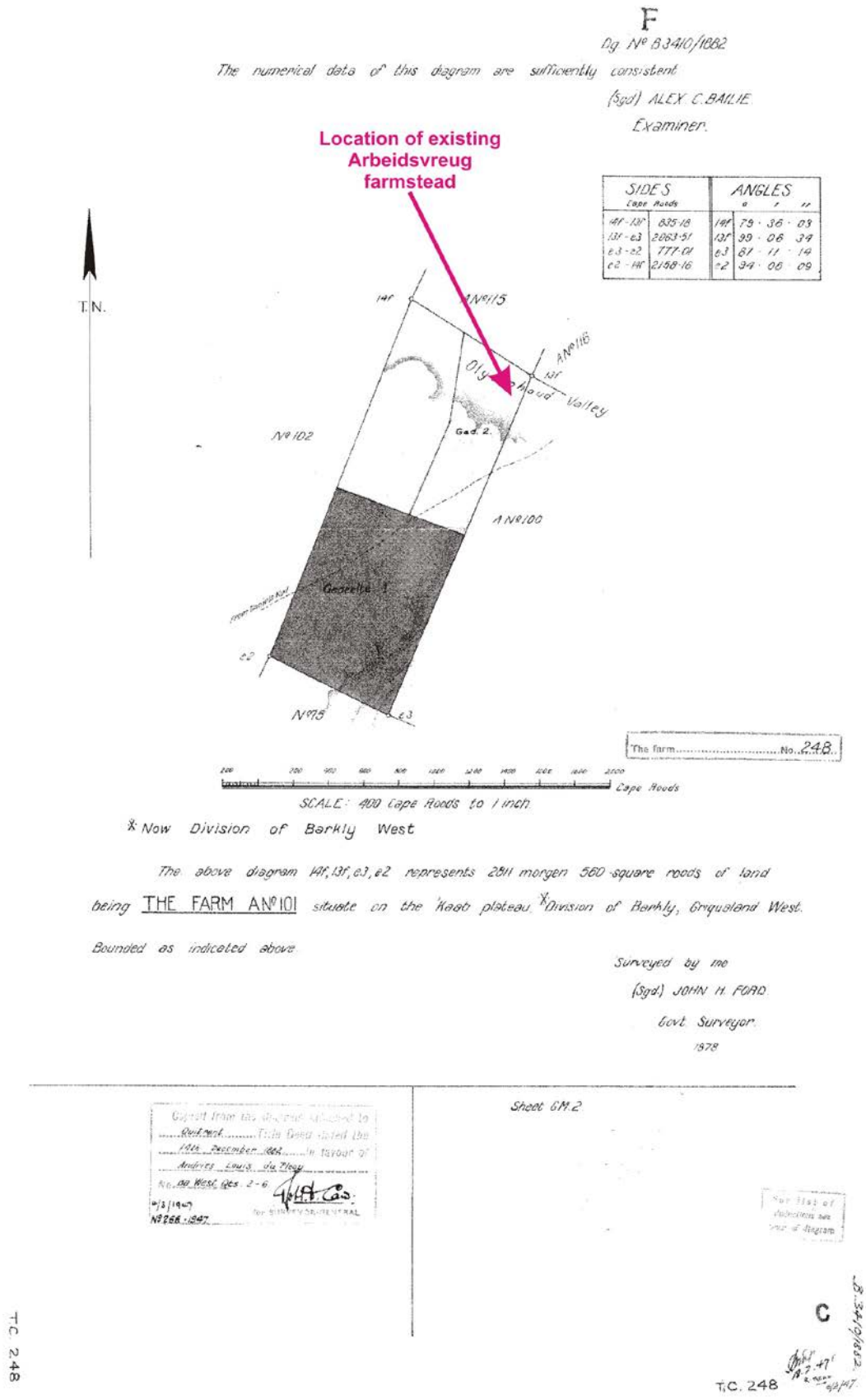


Figure 16. Surveyor's diagram of Farm 248.